



Public Health
England

Knowledge strategy

Harnessing the power of information
to improve the public's health

About Public Health England

Public Health England's mission is to protect and improve the nation's health and to address inequalities through working with national and local government, the NHS, industry and the voluntary and community sector. PHE is an operationally autonomous executive agency of the Department of Health.

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Foreword

Public Health England's success depends on our ability to credibly advise and encourage those able to take the actions that make a real difference to the public's health, primarily national and local government and the English public. We can only do this if we constantly add to the knowledge base and continually look for better ways to share knowledge that encourages people to take the right actions. In addition we have a public duty to provide this service in as cost-effective a manner as possible.

The Chief Knowledge Officer (CKO) directorate aims to deliver an internationally recognised, high performing knowledge and intelligence service encompassing research, statistics and know-how. Our main aim is to ensure that decisions we make about our health, and the health of the population, are based on the best information available and will deliver the best outcomes. *Informatics: the future*¹, gives PHE the responsibility to lead informatics for the whole public health system. The directorate's role in coordinating the efforts around information and knowledge management for the whole organisation mean that this document is the vehicle by which PHE will discharge this responsibility, within the context of the Department of Health's information strategy, *The Power of Information*².

I am extremely proud to launch this strategy, which describes our vision for the management of knowledge and information and the approach we are taking to realise it. It has been constructed around our eight priorities for knowledge, encompassing the generation and sharing of knowledge alongside a better understanding of our partners' needs and our commitment to work both effectively and efficiently. Taken together, the approach described in this strategy will inform and support the practice of public health and drive improvements in the public's health.

The formation of PHE has brought together a critical mass of public health expertise, but PHE is not the only place where public health experts can be found. Put simply, we cannot do this alone. Through activities described in this strategy we will work with our partners elsewhere in the NHS, the wider public sector, industry, academia, charities and from overseas. For that reason I hope you, the reader, will see this document as a starting point and I hope it clearly articulates where we want to end up and how we want to get there. Most of all, I hope you feel able to join us for the journey.



Professor John Newton
Chief Knowledge Officer



¹ <https://www.gov.uk/government/publications/informatics-the-future>

² <https://www.gov.uk/government/publications/giving-people-control-of-the-health-and-care-information-they-need>

Executive summary

This document describes the strategic approach that the public health system will take around information and knowledge in order to improve and protect public health and reduce inequalities. It is a response from the whole public health system, under the leadership of PHE, to the Department of Health information strategy, *The Power of Information: Putting all of us in control of the health and care information we need*.

This strategy describes how PHE will meet the knowledge and information requirements of public health practitioners across the public health system. For this reason, the primary audience for the strategy is knowledge and intelligence professionals across all directorates of PHE. This strategy exists because of a desire to improve the quality of knowledge in the whole public health system. Therefore the other key recipients of this document are the public health practitioners in local authorities who use public health knowledge on a day-to-day basis. These users, as well as all other stakeholders, are welcomed to shape the implementation of this strategy.

Taking the lead from *The Power of Information*, this strategy does not propose specific system implementations or set down detailed mechanisms for delivery. It provides a framework to support changes across the public health system, putting the user of knowledge at the centre and promoting flexibility and innovation within an environment that promotes efficiency.

The strategy is focused around the eight priorities for public health knowledge identified by PHE. It addresses the entire information lifecycle from understanding the requirements of those who are using public health knowledge through to what technologies PHE will use to disseminate knowledge.

Under these eight headings, and the overarching principles established in the introductory chapter, a series of actions and activities have been identified which will be used to support business planning cycles over the next five years. These have been clarified into 12 commitments.

Commitments

1. **Support openness and innovation.** PHE will develop an infrastructure to promote the sharing of ideas, data, techniques, tools and knowledge. PHE will support innovation through the adoption of a culture of openness, giving staff the time, permission and resources to experiment. This innovation will be shared so others can benefit.
2. **Provide the tools to let public health professionals do their jobs.** PHE will develop common services, datasets and tools and make them accessible for use

across PHE and the whole public health system. This will include a common approach to methods, standards and policies to ensure standardisation and consistency are adopted appropriately where it adds value. PHE will seek to minimise the number of policies and methodologies and maximise the number of voluntary 'best practice' standards.

3. **Understand and meet public health requirements for knowledge.** PHE will take a systematic approach to understanding user needs, both internal and external, including developing the public health workforce. A key measure of our success will be around our ability to meet these needs.
4. **Develop a strategy for research to:**
 - describe the science-base for PHE's core operational strategies
 - review the major research requirements of the wider public health system
 - map and develop for PHE's own research activity
 - manage and develop its academic workforce
 - investigate the opportunity for further alignment of PHE activity with the NIHR, MRC and Academic Health Science Networks
 - secure the resources required for PHE's academic activities and for public health excess treatment costs.
5. **Make data more useful and more accessible.** PHE will support data management activities across the public health system by rendering datasets linkable and publishing pseudonymised data publicly and by default.
6. **Work with others efficiently.** PHE will seek to work in partnership with external bodies and agencies such as NICE, the HSCIC, ONS, local government, the NHS and others to work to its strengths and delegate where another body can perform the same task better.
7. **Work with knowledge and data safely and securely.** PHE will develop an Information Governance Management Framework. An IG action plan will be developed that addresses compliance with the IG Toolkit.
8. **Ensure everything we do has a positive impact and provides value for money.** PHE will pay special attention to the translation of knowledge, provided by PHE, into direct public health action, most usually taken by local government. PHE will always seek to measure the impact of the knowledge products it publishes.
9. **Develop cross-system networks to share intelligence and expertise.** PHE will co-ordinate the creation of Intelligence Networks for Cardiovascular Disease, Mental Health, and Children, Young People & Maternity to deliver data, information, best practice, evidence and predictive models to support strategic decision making.
10. **PHE will deliver the national health surveillance strategy for England** which will:
 - agree standards for surveillance programmes and a plan for their implementation

- perform a stock-take of existing national health surveillance systems to provide assurance that the high level surveillance requirements of England are being met
 - identify gaps in current surveillance systems that need to be filled and to develop a clear case for new surveillance programmes or systems thus identified
 - identify any modifications or withdrawals that are appropriate for existing surveillance programmes or systems, especially those that are inadequately evaluated or of doubtful effectiveness, quality, or value
11. **Share and learn from experience.** PHE will commit to connecting people across the public health system to support the sharing of experience. This will be supported through the use of knowledge dissemination activities, events, collaboration software, the development of communities of practice, skills and expert directories and a glossary.
12. **PHE will develop a digital strategy** to meet user and government expectations and make best use of technology to protect and promote health and reduce inequalities.

Introduction

Public Health England (PHE) is the expert national public health agency which fulfils the Secretary of State for Health's statutory duty to protect health and address inequalities, and executes his power to promote the health and wellbeing of the nation³. It does this through the collection of evidence, the application of expertise to translate this evidence into knowledge and the effective dissemination of this knowledge to those who can use it to inform the right action at the right time.

In this context "information" is anything we gather, for instance, patient record data, stakeholder surveys, outcomes measures, lifestyle trends or medication use, with the intention of adding to the evidence base for public health. PHE can demonstrate that knowledge has been effectively shared when presentation of evidence has resulted in the right public health action, regardless of where that action is conducted. PHE already supports knowledge transfer through cost-effective approaches including peer-reviewed publications, guidelines and policies, comparator statistics, intelligence-sharing networks and visual tools.

PHE is a new organisation that draws together around 6,000 expert staff in possession of a wide range of skills and expertise in the fields of data, information and knowledge management. PHE has the expertise to identify what evidence is required, acquire that evidence and disseminate it through products that have the greatest impact on the behaviour of our partners in the health service, local and national government and of the public to improve and protect the public's health and reduce inequalities. However, PHE is one of several organisations in England that have major roles to play in the health information space. The success of all depends on close partnership, collaboration and respect that will facilitate data sharing and the exchange of ideas in an appropriate, timely way to ensure each can deliver for the whole population. Specifically, PHE will need close partnerships with the Health and Social Care Information Centre (HSCIC), the Office for National Statistics (ONS), the National Institute for Health and Care Excellence (NICE), NHS England, clinical commissioning groups, academic health science networks and academia more broadly, the third sector, supplier communities and all the teams in the extended public health community in local government and other organisations.

This strategy positions PHE firmly in the information environment as a leader in informatics in the new public health system and describes how high-quality data, information and knowledge will be provided alongside continuously improving infrastructure, products and services to meet our priorities. The strategy is written

³ **Public Health England: our priorities for 2013/14:** <https://www.gov.uk/government/publications/public-health-englands-priorities-for-2013-to-2014>

around the eight priorities of the Chief Knowledge Officer's directorate and, for each priority, highlights the vision – what we are aiming to achieve and the approach – how we are going to get there as well as providing a case study of what life might be like on realisation of the vision and a series of metrics against which we can measure our progress.

This strategy has described an overarching vision and some of the building blocks required to realise that vision. It will be used to inform immediate needs, provisioned through the business planning process across PHE, and will also guide spending decisions over the next five years. The strategy has also identified a number of gaps where the way forward is less clear. It is recognised that PHE's strategy for knowledge will need to evolve to close these gaps and key to this will be the establishment of a flexible organisational infrastructure for information and technology, capable of identifying and meeting new requirements responsively.

This strategy will support PHE in meeting its corporate priorities described in the document *Our priorities for 2013/14*. It will do this primarily through making it easier for PHE staff to support the public health system by rendering tools, techniques, knowledge and data easier to find and easier to use. For that reason, the key contribution the PHE Knowledge Strategy will make to achieving PHE's corporate priorities will be in supporting the final priority: *Develop our own capacity and capability to provide professional, scientific and delivery expertise to our partners*.

Of course this means that the strategy should in reality support all corporate priorities described in *Our priorities for 2013/14*. To illustrate this, case studies have been worked up for each of the chapters presented here which each try and demonstrate the impact the strategy will have on the achievement of these priorities. Finally, every chapter in this strategy describes a series of metrics to enable PHE to measure its impact. By measuring impact, and publishing the findings, PHE will meet a specific commitment undertaken under its sixth priority: *Ensure that we use data and information across the public health system to measure what we do, quantify from the outset the benefits of the new public health system and demonstrate value for money*.

The vision

In our capacity as leader for informatics for public health, PHE will furnish public health workers across the system with the knowledge, skills and tools to make the right decision at the right time based on the best available evidence. We will do this by efficiently generating, sourcing and processing high-quality data, adding to the evidence base and continuously working to translate this knowledge into actions which measurably improve the public's health and wellbeing, protect the public and reduce inequalities. We will stay at the cutting edge of public health informatics by fostering a permissive culture, which seeks to encourage new ideas and innovation while supporting staff with a framework of standards to ensure synergy and efficiency. We will be recognised as a national and international leader in the collection, use and interpretation of population-wide information to deliver relevant, timely, high-quality metrics, indicators, information and evidence to support public health and healthcare.

At its heart this strategy aims to do the following:

- everyone working in public health should be spending less time finding information and knowledge they need and more time using it
- the right knowledge should be available to the right people at the right time in a form that they are likely to use it
- PHE itself should be an information-led knowledge-driven organisation

Principles

This strategy sets a framework for the organisation without a wish to create central control of all information services. PHE will aim to strike the balance, recognising excellence across the organisation, encouraging others to share their knowledge and creating an exciting environment in which others wish to work while supporting effective and efficient delivery with a suite of standards and processes that are, for the most part, advisory rather than mandatory. PHE will foster an innovative culture by exposing core tools and expertise, adopting open principles, developing supporting standards and methodologies and increasing the organisation's appetite for risk.

Give users the tools and the opportunity to innovate and they will.

Public Health Knowledge products will be high quality and evidence-based

PHE will develop products that are trusted, relevant, credible and add value. Validated methods will be used to develop knowledge products, including those presenting data, intelligence or evidence.

Adopting open principles

PHE will encourage the use of open source tools, software and data through the establishment of communities of practice and other knowledge sharing techniques. Furthermore PHE will adopt open principles through the sharing of data (within the limits of a datasets security policy), software, methodologies and standards internally and ultimately through the appropriate public exposure of those products. Products will be shared freely and without limit wherever possible and increasingly they will be shared in standard formats to increase their utility.

Supporting standards and methodologies

Real innovation requires radical thinking and doing and is stifled by constraints. In contrast, organisations require a level of consistency to increase efficiencies, reduce risk and improve quality of operations and outputs. PHE aims to strike the balance by developing a framework that encourages constraint-free innovation but also supports the development and recording of methodologies and a process to agree consistent standards and then ratify those standards in organisational policy.

All staff will be free to innovate as long as they do so legally and they communicate what they are planning and doing. Once established, ways of doing things will be recorded as methodologies, in a common, searchable way. Where consistency is desirable, communities of experts in the field will select or develop a single methodology to be identified as a standard. Adopting a methodology as a standard is the way the organisation will state that it is satisfied that this single methodology is the best way of doing something. When the majority of staff need to do that 'something', there will be an expectation that the standard will be used. However, to allow for new developments, innovations and changing practice, staff will not be forced to use a standard. If the organisation needs to make all staff perform a particular function in a standardised way all the time, for instance for regulatory reasons, the organisation can choose to make an agreed standard into policy.

PHE will encourage the selection or development of best-practice standards, while minimising the number of non-standardised methods and mandated policies.

In this way, PHE will develop an open suite of methodologies and standards that PHE staff, the wider public health system and eventually the public will be able to access. Few will be stringently applied through policy, for instance in the management of systems containing personal confidential data (PCD), but others will be advisory, where users will have the freedom to select the most appropriate standards and methodologies to support consistency and aid interoperability between data, tools and services. The standards suite thus developed will cover the gamut of quality, information governance, information management, open principles and domain specific standards,

for instance those developed to support surveillance activities. Methodologies will be published, as a standard where there is clear agreement and in a common methodologies store where multiple methodologies exist to meet the same purpose. This will encourage consistency through expert consensus. Wherever developmental work is proposed, PHE will commit to ensuring that development is built upon best practice, within and external to the organisation, to ensure decisions are made based on the best available evidence.

Supporting innovation by increasing the appetite for risk

The pace of change in the whole area of information and knowledge is such that PHE needs to avoid over-bureaucratic processes. Over-constraining standards and a rigid heavy-handed approach to project management, often driven by an underlying fear of failure, results in projects that are delivered slowly and can even be obsolete by the time the project is completed. This will require new ways of working and the ability to take risks, accepting that on occasion we will fail, but providing we are open and honest we will learn from these experiences and move forward. This will require a permissive culture led from the top. PHE will develop leaders and line managers to support staff to make changes and communicate those changes to the rest of the organisation. Staff will be encouraged to spend time in groups containing a diverse skill and discipline mix with the aim of using communities of interest and other knowledge management techniques to foster new ideas and take them through exploratory cycles of rapid development. The key to the success of this will not just be the move away from a risk-averse culture, but also the tools to communicate ideas and products to a geographically dispersed organisation.

In addition PHE will identify new ways of funding innovative projects to reduce delays associated with identifying changes to budget lines or submitting bids for capital funds. The two key delays for many projects are waiting for approval to proceed and identification of funds. Significantly reducing the impact of these delays will be central to PHE's approach to innovation.

Supporting effective and efficient delivery

PHE is a public body and has a duty to spend public money effectively. While innovation and free-thinking will be encouraged and supported, structure will be applied to ensure "enterprise class" tools and systems are used consistently and promoted through the standards suite. PHE will undertake to identify and define the knowledge and information requirements of its core business elements. It will do this through the identification of business leads from across the organisation, experts who perform these activities as part of their daily work. Each lead will be encouraged to take forward the development of strategies that will deliver requirements while maximising the return on investment.

Core tools, services and expertise

PHE will identify and provision common tools and services that will speed up and reduce the cost for new outputs, systems, processes and other developments. Expertise will be identified and readily accessible following a skills audit that will support the creation of a directory of expertise and will quantify the skills already available to PHE. This community will help to identify best practice, ensure recognition of key individuals, promote excellence and provide training and accreditation.

PHE will develop core expertise where necessary. One way it will do this is by centralising generalist software development expertise functions into a single software development service.

These core tools and services will put the user at the centre and will reflect that user requirements may differ wildly and may even require different solutions. One example of this is the difference between analytical research and PHE's role as a category 1 responder.

Metrics of success

This strategy needs to deliver the vision for knowledge and information use across the public health system. The metrics of success will be closely aligned with this vision. Each chapter is structured so that specific metrics are documented for each priority; however the success of the strategy as a whole will be measured against the following overarching aims:

- PHE will be acknowledged as a leader in health informatics and a respected provider of public health data and information products and services
- PHE will have a record of successful delivery that changes practice and improves patient and population health
- PHE will have fostered an open and innovative environment across the public health system that ensures the right people have the right tools to make a real difference
- PHE will operate its knowledge and intelligence functions efficiently, demonstrating value for money for every product developed and every data item collected

Priority 1: Understand and meet the needs of users, particularly local government and local NHS

Vision

PHE is committed to supporting local access to information, products and services that meet local needs and developing the informatics workforce in the local public health system.

The Health and Social Care Act 2012 has introduced two parallel public health systems, in local government and in PHE, which need to work as an integrated public health system and specialist workforce. The emerging commissioning landscape is complex and has important, highly varied and context-dependent information and knowledge needs, which will be covered by partnerships between NICE, ONS, HSCIC, NHS England and PHE. PHE will make sure that it can connect people with the information they need, where and when they need it, in a way that fully meets their requirements.

Commissioning structures and local government need access to knowledge and intelligence in order to improve population health outcomes. For our Knowledge and Intelligence Service, this relies on correctly identifying customers' needs, and providing solutions, which are appropriate to the local level. PHE CKO has already done an extensive analysis of customer needs in preparation for Go Live.

PHE will support the development of an empowered and well-resourced local level effecting change, where commissioning of healthcare and public health services is based on up-to-date needs assessments and the latest evidence about what works in addressing those needs. PHE will do this by adopting a three-pronged approach: provision of products and services, enabling appropriate access to data and assisting in workforce development.

Approach

In August 2013 PHE published the factsheet *Knowledge and intelligence: Public Health England's local contribution to the work of local government and the NHS*⁴. This clearly stated that local intelligence teams in local government and the NHS are the first port of call for local

⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/232030/PHE_local_contribution_to_the_work_of_local_government_and_the_NHS_flyer.pdf

intelligence enquiries and that PHE will work in partnership with these teams. In the accompanying letter⁵, PHE confirmed that this partnership working would be through local PHE knowledge and intelligence teams (KIT) and centre directors, who will work together and continue to liaise with local government and local NHS to ensure that the support provided locally is as effective as possible.

PHE operates a nationally co-ordinated Knowledge and Intelligence Service (KIS), which is operated through eight distributed KITs in collaboration with the National Drugs Treatment Monitoring System (NDTMS) and the Field Epidemiology Service (FES). The KITs will provide a set of national support services to PHE and a more locally determined service to local authorities and local NHS in collaboration with PHE centres. The KIS will develop a network of topic leads, linked to experts across and outside of PHE spanning key public health risks and determinants (eg tobacco, transport), disease areas (eg cancer and vascular disease) and cross-cutting themes (eg health inequalities and sustainability). The KIS will work to:

- build a national population health intelligence system predicated on easy access and clarity of presentation of key population health metrics and indicators
- work locally to ensure appropriate data, analysis and support for local teams informed and sometimes co-produced with local teams
- work with national partners including the HSCIC and NHS England to ensure data availability and access
- develop translational and interpretation services for local use of data outputs and products
- seek to improve statistical and health literacy of public health intelligence analysts and broader local authority workforce through formal and informal professional development
- and work within PHE to develop the knowledge and evidence function in collaboration with NICE.

The local system will be enabled to make best use of knowledge and intelligence products and services by the national KIS. This local-facing service will develop and make available data, evidence, and support to use products directed at commissioners and providers of public health and healthcare services. It will be user-led, sensitive to the developing localism agenda and complementary to the work done by other national partners.

PHE will support local teams to make the right decision to reduce the impact of disease and hazards to health and improve public health, by engaging with local teams, making knowledge and information available and delivering data, interpretation and evidence.

⁵ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/232028/Letter_on_Public_Health_Englands_local_contribution.pdf

PHE will take a systematic approach to understanding user needs, both internal and external to PHE, which will include formal information needs analysis with the wider public health community. It will ensure that it takes account of what is already known, using the existing evidence base, as well as undertake targeted surveys with a range of users and stakeholders. It will work collaboratively with partner organisations in order to align national products and services, and to use existing expertise and experience where it is available.

This will include:

- systematically identifying information needs from a representative sample of users and stakeholders in order to help improve information products and services
- commissioning or conducting in-depth interviews to develop a set of user profiles from user survey data

Provision of products and services

A project has been established to catalogue products and services provided by PHE sender organisations to local teams. This project includes a short-term component that has ensured continuity of provision of previous services since 1 April 2013, and a mid- to long-term component that will maintain the products and services catalogue, updating, decommissioning and introducing new products and services in close collaboration with the user base.

Enabling appropriate access to data

Local authority-based public health teams (LAPH) have presented a general case that access to some form of record level data is essential for their business continuity. PHE's general position has been that this requirement is a valid one, but that the use of de-identified data should be the norm, and the use of PCD the exception at a local level. Further work is required to identify the specific local authority public health requirements for PCD, but this is likely to be to support local needs assessment, service review, or benchmarking data on demographics (including deprivation), care activity (primary care, secondary care, specialised, community), costs (tariff and non-tariff), and events (births, deaths, disease) and the subsequent targeting of interventions to specific risk groups. Access to these data through either NHS England or the HSCIC is currently unclear, while PHE has an interest in managing a range of data internally.

PHE is scoping the development of a service for local authority public health based on the datasets available and held by PHE, directed towards the needs of LAPH. A Central Clearinghouse function will co-ordinate release to the local level of either PCD or pseudonymised data by KITs. PHE will define its internal data management function and supporting informatics architecture with due regard to the national information governance framework and the strategic direction taken by the HSCIC and NHS England.

Assisting in workforce development

The local public health intelligence workforce will be developed through formal and informal support in response to the consultation⁶ on *Healthy Lives, Healthy People: Towards a workforce strategy for the public health system*^{7,8}. PHE will provide structured training programmes, on-site and within PHE structures, placements and secondments, introducing a rotational scheme enabling exchange of resources between PHE and local system partners that will facilitate mutual understanding and longer-term career pathway opportunities. PHE will also facilitate “Train the Trainer” and cross-locality training schemes to support the exchange of best practice between local intelligence teams. PHE will ensure that teams in local government are appropriately trained, informed, guided and assessed and will support the development of local informatics teams, taking the time to establish pathways for career progression in public health informatics and training programmes to get the best out of staff while helping them to progress.

How will this work in practice?

In order to complete a cardiovascular disease needs assessment, a local public health strategist and public health intelligence analyst need to benchmark local outcomes against regional and national values, and identify population and individuals at risk. Having checked support available in the online knowledge and intelligence catalogue of products and services, they know they are able to benchmark local outcomes using aggregate data, such as health profiles maintained and updated by the KIS. In order to maximise the use of available resources through the targeting of interventions they proceed to a risk stratification exercise using a linked dataset comprising SUS data, mortality data, and primary care data. This dataset will be provided upon demand by the local KIT, using a standard request protocol.

Use of the benchmarking information helps to understand the current scale of the issues facing the population. Use of the primary care data in the risk stratification exercise allows the strategist and analyst to understand at a more local level not only the numbers with cardiovascular disease risk factors such as high blood pressure, drinking too much alcohol, smoking, poor mental health, insufficient exercise and obesity, but also where the populations at risk are. This information allows the capacity and location of commissioned lifestyle services to be determined. Additional local knowledge and insight about the population will help target the right individuals with the

⁶ Public Health Workforce Strategy – Next Steps for the PHI&I Workforce (Sept 2012)

⁷ <https://www.gov.uk/government/consultations/healthy-lives-healthy-people-towards-a-workforce-strategy-for-the-public-health-system>

⁸ <https://www.gov.uk/government/publications/healthy-lives-healthy-people-a-public-workforce-strategy>

right messages to recruit to lifestyle services in order to help people change their behaviour to live longer and healthier lives in line with PHE's first corporate priority: *Helping people to live longer and more healthy lives by reducing preventable deaths and the burden of ill health associated with smoking, high blood pressure, obesity, poor diet, poor mental health, insufficient exercise, and alcohol.*

Metrics

This priority is geared around understanding the needs of the local public health system and meeting those needs. These provisional metrics have been designed to assess PHE's ability to both meet those needs and assure itself that through meeting those needs, real improvements are being made:

- a measure of how completely the KIS catalogue of products and services meets local user needs
- quality metrics for the Central Clearinghouse including the number of requests and the speed and quality of responses
- evidence of behaviour change or action taken in response to advice provided by the KIS or data from the Central Clearinghouse

Priority 2: Assess priorities for the support, conduct and translation of public health research

Vision

PHE employs around 6,000 staff, including scientists, researchers and public health professionals and aims to build on the internationally respected body of expertise created under PHE's precursor organisations by experienced scientific and public health staff engaged in high quality research. A significant part of the organisation's role is the sharing of our information and expertise with local authorities, industry and the NHS, to help them make improvements to the public's health. This evidence-based advice is developed through rigorous research programmes into the key public health areas and is provided through published reports, articles in scientific journals, public statements, direct advice to senior Government officials and ministers, and through PHE membership of, and input to, advisory committees and groups run by other Government Agencies and Departments. In collaboration with experts across PHE and beyond, and with the support of the research and development division, PHE will identify public health research priorities and continue to develop our own capacity and capability to provide professional, scientific and delivery expertise and advice to our partners.

PHE will strive to ensure all public health decisions, be they policy or operational, are based on the best available evidence.

Approach

A review of PHE research is being undertaken which includes a retrospective review of that undertaken by the Health Protection Agency (HPA) between 2008 and 2013. This review will identify principle investigators, research partners, funding agencies, timescales and outputs and describe the extent and type of research undertaken by PHE and its sender organisations. It will enable PHE to describe its research activity to the wider system.

A research strategy for PHE will be completed by March 2014. This will describe how PHE will facilitate and support population and public health research conducted by its partners and the research that will be undertaken by PHE. The strategy will ensure that public health research demonstrates academic excellence and value for money. It will enable PHE, alongside its partners, to nationally identify the priorities for research in

alignment with current and future population and public health needs. Work to inform the strategy will consist of a number of contributing projects:

- a description of the science-base for PHE's core operational strategies. This will include a second UK Global Burden of Disease project looking at inequalities in burden within the UK
- a review of the major research requirements of the wider public health system in order to focus research on the important gaps in knowledge and the unmet information needs of patients, the public and public health professionals drawing especially on our interactions with local authorities and national partners
- a mapping and development strategy for PHE's own research activity including our health protection and vaccine research, but also in other areas
- an academic strategy for PHE to manage and develop its academic workforce including honorary clinical academics and trainees, including job planning appraisal and revalidation
- an assessment of the opportunity for further alignment of the PHE activity with NIHR public health programmes, relevant MRC programmes and the work of Academic Health Science Networks
- a project to secure the resources required for our academic activities and for public health excess treatment costs

In support of the continued development of high-quality research evidence, PHE will manage key public health priorities as cross-organisational programmes, thereby effectively focussing relevant resources in order to achieve objectives. The development of these programmes, in collaboration with public health partner organisations, is a key element of PHE's research strategy.

The research strategy will identify the fundamental infrastructure required for research, including access to high quality data. It will explore the need for provision of linked data (priority 3) including mortality, morbidity and disease registration datasets to public health researchers internal and external to PHE. It will further explore the partnership with the Clinical Practice Research Datalink (CPRD) to this end. It will also identify where closer working relationships with qualitative data providers, including primary care surveys and health survey England would be beneficial for research.

How will this work in practice?

A senior programme manager in PHE needs to implement a national policy to adopt a new programme of disease prevention, directly contributing to the delivery of PHE's second priority: *Reducing the burden of disease and disability in life by focusing on preventing and recovering from the conditions with the greatest impact, including dementia, anxiety, depression and drug dependency.*

As a matter of course, the programme manager is able to easily identify and collate the best available evidence and present it publicly as part of the launch of the new programme. In addition to explicitly presenting the supporting evidence, the programme manager is able to present gaps in the evidence base and a partner academic institution has been able to successfully bid for funding to address this gaps as it is clearly identified as a priority area of public health interest. The gap is rapidly filled as data from the newly implemented programme is linked to other datasets and made accessible to the research group through Clinical Practice Research Datalink and PHE.

Metrics

Delivery against this priority will result in a better organisation of existing resources, and a coordinated approach to seeking external resourcing, to support a future research programme that is able to address the most important unanswered questions in public health. These provisional metrics have been designed to measure how well PHE is able to meet this goal.

- all PHE publications, strategies and major statements must be accompanied by an evidence statement and where appropriate will have had an independent assessment of the evidence that underpins them
- PHE's business planning process is able to quantify and match its research capacity to its core operational research strategy (demand).
- national, subnational and regional estimates for premature mortality (Years of Life Lost (YLL) and Years Lived with Disability (YLD)) are published alongside evidence to quantify the extent to which core risk factors impact on these locally
- the research and development questions which are key priorities for PHE and the wider public health system in the short medium and long terms have been agreed with national and regional stakeholders. This will address the research components for each of PHE's published priorities⁹
- a process to achieve coordination in addressing these priorities across the research community has been agreed with stakeholders

⁹ Public Health England: our priorities for 2013/14: <https://www.gov.uk/government/publications/public-health-englands-priorities-for-2013-to-2014>

Priority 3: Work with others to build and manage linked datasets that are safe and available for use

Vision

PHE owns one of the most complex and expansive health data collections in the world. PHE will, within the limits of English law, prepare datasets to enable rapid unambiguous linkage as and when the need to do so is identified. It will be possible to follow patients and the public across care settings, health events and lifestyle changes in order to:

- inform change
- develop national and local policy
- effectively respond to emergencies
- support commissioning and other decision making
- measure our impact
- and encourage research, hypothesis generation and innovation

Crucially PHE will do this while limiting access to PCD to those who need to know and supporting effective governance of information.

NHS England will increase the collection of identifiable linkable data from all care settings in ways that will support public health analysis and research. This knowledge and information strategy will ensure that PHE is able to make the most of the information and knowledge resources it possesses as NHS England co-ordinates the adoption of open data standards across the NHS. PHE is highly committed to supporting NHS England and the HSCIC in the creation of *care.data* and in the assertion of open data principles.

Approach

If done correctly, PHE will become an exemplar and world-leader in health data collection, processing and interpretation. The challenge of how to achieve this is well captured by paraphrasing Lou Platt's reflection about Hewlett-Packard – if "PHE knew what PHE knows".

The successful delivery of this strategy will involve close partnerships inside and outside the organisation. The ultimate responsibility of this strategy for PHE is to ensure that we have our own ability to deliver the intelligence and information resources that underpin the population and public health. PHE will establish formal partnership arrangements

with other organisations in the public, commercial and third sectors and forge academic links that allow us to strengthen our intellectual base.

Every aspect of our activity needs to be measurable – without this we cannot quantify the effects of change, ensure we deliver value for money and demonstrate that we are improving the health of the population and individuals. It is the data that underpins all these activities and provides the raw resource for the metrics and indicators by which we can demonstrate and measure our success. Using data wisely requires that we understand each individual data item, its provenance, quality and meaning. Without this we cannot hope to provide robust high-quality intelligence for public health and healthcare. PHE will institute standard processes and tools to aid the collection of this metadata (data about data) for PHE datasets, which will be presented openly, first to PHE staff and then published on the PHE website, to highlight what data holdings are owned by PHE and what the limits of their use may be.

If PHE knew what PHE knows

Across the organisation there are many collections of data that PHE should be able to join appropriately to extract new information and knowledge. It should be possible to do this quickly and efficiently so that new questions can be asked and the answers delivered as rapidly as possible.

PHE will support functional interoperability between datasets through the adoption of open data principles¹⁰ to expose the knowledge of its data holdings to PHE staff, the wider public health system and the public. Core principles of functional interoperability will be adopted first by datasets that are used by large numbers of individuals. PHE will encourage the adoption of these principles in other datasets at the discretion of dataset and system owners.

To support patient level data linkage, data will be held at the level of an individual patient wherever possible. A pseudonymisation service will be developed to support the ability to transform an identifiable dataset into a pseudonymised dataset, replacing or supplementing identifiable fields (name and NHS number) with a PHE identifier, unique for that patient but common across datasets to support linkage. In its first year, PHE will link patient level cancer datasets to support analysis as a proof of concept for linkage technologies and processes that can be more broadly applied to public health.

PHE will adopt an organisation-wide data dictionary in which system owners will provide a listing of the data items they collect and associated definitions. Systems themselves will be logged in an Information Asset Register and contain metadata such as data quality metrics, provenance, access details, ownership and constraints around use. This

¹⁰ Open Data Certificate (beta) - <https://certificates.theodi.org/>

register will be open for interrogation by PHE staff and, as the organisation matures, the register will be presented through the website.

In the first instance PHE will look to supply tools to enable safe and accurate data linkage where permissions exist, rather than linking datasets by default. For this reason, although use of industry-standard data sharing services will be encouraged, they will not be mandated. Some systems will develop standard interfaces or querying tools to support linkage. For instance, the geospatial dataset, maintained by the GIS team in Porton, will expose geospatial reference data and population estimates to ensure consistent use of data across PHE while reducing the overhead on system owners, but taking advantage of this service will be at the discretion of system owners themselves. In order to take this work forward, PHE will form a small central team that is responsible for developing the data dictionary and rules to support maintenance of records by system owners as well as providing PHE-wide expertise on data resources and data linkage.

Academic and commercial partnerships, intellectual property and transparency

Data owned by PHE is valuable to the wider national and international healthcare economy. PHE commits to publishing raw, anonymised datasets through the use of nationally approved standards¹¹ but will need to develop close working relationships with information intermediaries and customers in the provision of information products. PHE will develop the commercial expertise to identify, capture and exploit the intellectual property we own and create. PHE supports the governmental directive to expose suitably anonymised data in the public domain as soon as it is possible to do so.

Information collection

In some cases PHE collects data directly and in others PHE sources it from partner organisations. PHE will continue to operate as an expert collector of data for public health purposes directly from NHS laboratories, NHS acute trusts, primary care, genito-urinary services and services treating misusers of drugs. PHE will work in strong partnership with the HSCIC, ONS and other data collecting organisations to ensure data collections managed by all parties are supported by national standards, expanded to support additional (secondary) uses and are continuously improved with a strong focus on data quality and efficiency.

PHE is in the process of establishing agreements with partner organisations to ensure PHE is capable of receiving the data it needs to perform essential public health activities and has undertaken to establish repositories of Hospital Episode Statistics (HES) and

¹¹ Anonymisation Standard for Publishing Health and Social Care Data - <http://www.isb.nhs.uk/library/standard/128>

data on deaths and births in England, supplied by the HSCIC and ONS respectively. These datasets will be pseudonymised to support linkage and made available to PHE and public health staff in appropriately de-identified forms.

In order to support effective and secure information sharing, PHE has developed a secure drop-box that is available to all PHE staff that wish to use it. The secure drop-box enables PHE to share sensitive information (such as patient data) between itself and external organisations. The system uses strong encryption, and is compliant with the required security standards, such as audit logging. Its primary function is sending data to external recipients where this is not permissible by email.

Data quality

PHE will aim to ensure that data and information are captured accurately and once only from any given source, enabling PHE to have the appropriate information available at the right time. Data quality will be improved through a framework that will deliver the high-quality data and information that are required to underpin and inform the public health response. PHE recognises that an understanding of the systems and people responsible for collecting data is fundamental to understanding data quality limitations and improvements.

All staff will recognise and work towards PHE's commitment to maintaining the highest levels of data quality possible. They will understand and acknowledge that good data quality is the product of continued effort and attention to detail, ensuring that PHE records the data that it needs, accurately and as comprehensively as it can.

PHE will develop a framework to measure and drive improvements in data quality, underpinned by a set of standards as part of the PHE standards suite (p12). Poor quality data and information impacts directly upon its use and effectiveness, thus reinforcing the need for standards. In clinical care, poor quality information may result in patients being harmed or distressed or undermine the trust clinicians place in recorded information. Likewise, in public health, poor quality information may undermine the validity of conclusions drawn, resulting in poor quality commissioning and potentially putting the public at risk.

The development of data quality standards is fundamental to support the drive to improve the quality, accuracy and timeliness of the data that ultimately inform public health action. To ensure that these data are fit for purpose, there needs to be a consistency in approach, both over time and geography, for data collection, analysis and presentation.

There are many standards currently being applied within the field of public health. These have been developed in a variety of ways to serve different purposes and vary also in their level of formality; many are for internal purposes rather than industry

standards. It is important that there are an agreed set of authoritative standards for data quality that are appropriate to and applied by PHE. These should be developed and agreed based on existing standards while also considering those that are in development.

Information governance

PHE has a crucial leadership role to play in the national Information Governance (IG) framework and following the conclusions of the “Information Governance Review” and publication of the Code of Practice for the Management of Confidential Information, will work with its key partners and stakeholders, to establish a clear, effective and efficient national, regional and local data sharing framework for public health information and personal data. Such a framework must have a positive effect on the flow of data appropriately, establishing and documenting clear legal bases and with a view to improving the processes between and within public health bodies.

PHE will assure itself and its stakeholders that the information it uses, whatever its form or content, and whatever its context, will be processed in accordance with prevailing legislation and standards of best practice in relation to information.

In order to develop this approach PHE has taken into consideration:

- PHE objectives
- requirements of the Department of Health Information Governance Toolkit, Department of Health Information Assurance Policy and Strategy, Cabinet Office Information Assurance requirements and by codes of practice for confidentiality, information security and records management
- organisational developments affecting information governance issues

This approach will be updated in the light of the recommendations of both the Information Governance Review and the new NHS Code of Practice for the Management of Confidential Information.

PHE will develop an Information Governance Management Framework that identifies senior responsible roles and bodies, resources, key policies, defines necessary training and guidance requirements for staff and provides a way to manage information risks across the organisation.

This framework will deliver the following:

- **confidentiality:** Access to data shall be confined to those with appropriate authority
- **integrity:** Information shall be complete and accurate. All systems, assets and networks will operate correctly, according to specification and data quality standards

- **availability:** Information shall be available and delivered to the right person, at the time when it is needed. In particular a records management strategy will be developed
- **security:** Information shall be stored and transferred securely. A strategy will be developed to address information security drawing from the IG Toolkit and objectives relating to BS ISO 27001
- demonstrate at least a “Satisfactory” compliance with the Department of Health IG Toolkit within a timeframe to be agreed with the Department of Health or NHS England IG Policy team. In May 2013, PHE will agree a view of the IG Toolkit to use and in October a baseline will have been completed against this view. PHE commits to publish a revised IG Toolkit Assessment that demonstrates compliance with key information risk controls, or where there are exceptions, an improvement plan to address less than satisfactory performance by 31 March 2014

The PHE IG function will give priority to ensuring systems that have or require Section 251¹² support, or are dependent on patient-related data flows from Data Controllers and data sharing agreements, comply with IG Toolkit requirements. An IG action plan will be developed that addresses compliance with the IG Toolkit and other terms and conditions of the “Information Governance Assurance Statement”.

The formation of a new agency from multiple sender bodies will bring together staff and stakeholders with differing cultures, policies and processes. A communications strategy will raise awareness of PHE policies and processes. Training will be delivered through staff induction sessions and a minimum mandated training requirement for all staff will be identified on the Mandatory Training Schedule. Enhanced training will be provided for PHE IG lead roles and system owners.

The transparency and accountability agenda¹³ will be addressed in line with Cabinet Office guidance¹⁴.

Performance management of information governance

Year-on-year improvements in measurable IG performance will be monitored by the IG Office using the IG Toolkit and informed by information asset, risk management and contracts management colleagues and tools, and by an annual audit programme. The IG Office will enable the provision of evidence by system owners by means of the Information Asset Register and related tools, to support PHE's IGT Assessment.

¹² NIGB website: section 251 - <http://www.nigb.nhs.uk/s251>

¹³ Policy: Improving the transparency and accountability of government and its services <https://www.gov.uk/government/policies/improving-the-transparency-and-accountability-of-government-and-its-services>

¹⁴ Cabinet Office Open Data Strategy <http://www.data.gov.uk/sites/default/files/Cabinet%20Office%20Open%20Data%20Strategy.pdf>

Executive directorates will be responsible for information assets and IG improvement plans within the area of their responsibility. The PHE National Executive and Audit and Risk Committee will have oversight of information governance assessment and performance. PHE's Information Governance & Caldicott Group (IGCG) will approve the PHE IG assessments and improvement plans. Reporting lines for the IGCG are yet to be agreed.

How will this work in practice?

Following an investigative query on standard anonymised and linked datasets available to all PHE staff, a microbiologist based within a regional laboratory wishes to conduct a study looking at long-term effects of *Helicobacter pylori* infection. The study proposal had been prepared rapidly as the microbiologist was able to search the PHE Information Asset Register to determine that datasets on microbiological diagnosis, cancer diagnosis, hospital episodes and outbreak investigation were all available for use and are completed to suitable quality. Following approval the same day, the microbiologist then contacts the linkage service within PHE and arranges for data to be rapidly linked, according to the data linkage standard recorded in the national standards suite, across the four datasets. The linked dataset is then provided to her in an anonymised format that is assured against the national standard to enable her to publish the data on the PHE website.

The rapid availability of common toolsets and data meant that the outcomes from the study were more readily applicable and were more quickly able to directly contribute to PHE's third priority area: *Protecting the country from infectious diseases and environmental hazards, including the growing problem of infections that resist treatment with antibiotics.*

Metrics

This priority focusses on the internal collection and management of data and the processes to enable PHE to assure itself that this data is managed well. It has established the need for new services, processes and standards and the provisional metrics proposed below are correspondingly process and output-based.

- all PHE assets are recorded on the Information Asset Register
- PHE has assured itself as meeting at least a "Satisfactory" compliance with the Department of Health IG Toolkit
- a linkage service is developed and used
- data quality standards are developed and adopted
- PHE has presented anonymised data from all collections owned by PHE in a standard format to the public

Priority 4: Bridge the current gap in the translation of knowledge into action

Vision

PHE has a duty to provide knowledge products that help decision makers, in local or national government or elsewhere, to enable them to make the right decisions based on the best available evidence. Supporting decision makers external to PHE in this way is vital for PHE to meet its objectives.

The translation of knowledge into action requires knowledge from data, knowledge from research and knowledge from experience. PHE will develop a strategic approach to the facilitation of knowledge transfer within PHE, and throughout its communities, networks and partners. It will provide a mechanism to support learning before, during, and after actions, and in particular it will ensure that the knowledge from experience is made easily available to supplement the knowledge derived from published research evidence and data. PHE undertakes to measure the impact of these knowledge products on the public health system and the public's health underpinned by the science of implementation.

PHE will establish organisation-wide processes that support the quality assurance of the knowledge products that we create for use by patients, public and professionals. PHE stakeholders and others who use the knowledge and information products and outputs that PHE creates will be confident in their quality and robustness through appropriate and proportionate quality assurance processes.

Approach

PHE will take forward this agenda through:

- the use of the best evidence in knowledge translation
- the development of efficiently provided knowledge products
- the quality assurance of those knowledge products, including the assurance of applicability of source data
- and the measurement of the impact of those products on behaviour change within the public health community and most importantly on the level of impact the provision of knowledge services has on the public's health

Development of knowledge products

PHE has inherited a large number of existing knowledge products from sender organisations. PHE will build on this legacy to organise these products into a consistent and clear product suite, aimed at specific audiences that meet common quality criteria. Some will be delivered through a data gateway, some through the PHE website and others will be delivered independently of both. Our products need to be high quality, locally relevant and impactful. These knowledge products include the following, often in combination:

- indicators and indicator products
- tools and models (atlases, profiles, cost effectiveness, return on investment models, surveillance dashboard, evaluation frameworks)
- evidence reviews, factsheets, guidance

Indicators and indicator products

Indicators are summary measures that aim to describe in a few numbers as much detail as possible about a system, to help people understand, compare, predict, improve, and innovate¹⁵ informed by evidence of what works. PHE has inherited a large number of indicators and information products from sender organisations including Health Protection Profiles and the Cancer Commissioning Toolkit. PHE will develop consistent systems for indicator development, production, quality assurance, maintenance, storage and display, presented within a sub-strategy for indicators.

The strategy will ensure PHE generate a comprehensive suite of indicators for a wide variety of health determinants and outcomes, including selections of indicators in information products aimed at supporting the planning and commissioning of services to improve health. PHE will develop a common repository of indicators for product development, and these will be available to other partner organisations and the public. PHE will develop an overarching governance process to ensure that the selection of indicators for information products will be both user-led and technically appropriate. This will be supported by the development of a suite of standard methodologies within PHE and with partner organisations.

Tools and models

Our stakeholders are asking for products that can help them make the business case for investing in prevention and public health interventions, and can help them demonstrate effectiveness and cost effectiveness of the work that they are undertaking or proposing. PHE already produces a range of tool to support decision makers in the

¹⁵ Pencheon D, *The Good Indicators Guide: Understanding how to use and choose indicators*, Association of Public Health Observatories and NHS Institute for Innovation and Improvement, 2009

NHS and local authorities. These are being made available through the Data and Knowledge Gateway. Examples include:

- cost-effectiveness tools including the Spend and Outcome Tool
- standard evaluation frameworks for weight management, physical activity and dietary interventions
- models, eg disease prevalence modelling

We intend to increase our suite of tools and models in accordance with our stakeholders needs. We will be developing a tool to make the case for return on investment for prevention. We will be undertaking large-scale population based modelling, the purpose of which is to support the prioritisation of decisions that need to be made between different policy and programme interventions for different population groups. Depending on demand we will be developing further standard evaluation frameworks.

Evidence reviews, factsheets, briefings, handbooks

PHE produces a range of published products for different audiences, ranging from systematic reviews of the evidence, rapid evidence synthesis, guidance documents, fact sheets and handbooks. The latter three outputs bring together the three sources of knowledge, evidence from research, from data and from experience, often in the form of case studies.

We will be introducing standard processes that ensure consistent methods for assessing evidence. We will base these on NICE level evidence standards. We are already working with NICE on resource types and quality frameworks. This will mean that NICE and PHE would share the same knowledge structure, definitions, and a shared approach to quality assurance and methodological standards for different types of knowledge. The work on resource types will help to ensure that the underpinning quality processes for any content produced by PHE is up to standards. We need also to build up through the library service the literature searching support which will be another way we can assure quality.

Active knowledge services

Even where comprehensive digital collections exist, effective use may still need knowledgeable and skilled interpretation and subsequent alignment with the local context, and local knowledge to get effective results. Active knowledge management requires accessible, tailored knowledge services to provide expert synthesis, navigation, mediation and training to PHE and the wider system in order to facilitate efficient knowledge translation.

A responsive, local or network-based knowledge services team can provide support in knowledge and information management where possible to those engaged in public health, and to local teams and communities. Crucially, it can ensure effective

collaboration and reduce variation and duplication in knowledge and information provision. There is already a wide range of knowledge information services and expertise in sender organisations and the wider NHS, and we will aim to ensure that this is accessed and made available wherever possible. The responsibility for developing these services will lie with the Knowledge and Intelligence Service (priority 1).

High-quality knowledge services are dependent on staff having relevant skills and competences. To aid the assessment of skills required, PHE will develop a specification describing a “minimum standard” of knowledge services and products a local authority should have in place, and the skills required to deliver them. This will enable local staff and teams to make an assessment of the skills they have available, or to identify where they may be developed. Existing benchmarks and quality frameworks, such as Knowledge Management and Knowledge Translation frameworks, and the NHS Library Quality Assurance Framework¹⁶ will be used where possible.

Services will be delivered to the point of need, both mediated and digitally, using existing resources wherever possible. Potential services could include:

- evidence synthesis
- tailored knowledge support packages
- mediated literature searching and filtering
- current awareness services
- provision and training in KM tools and processes
- information skills training
- question and answering services

PHE data and knowledge gateway

Across PHE, there are many high-quality reporting tools that provide data and analysis to public health professionals. PHE has developed a way to provide simplified access to these tools on an interim basis through a gateway¹⁷ on the PHE website, while the website is being developed. These tools are accessible through a simple structure, which allows users to click on the area or system of interest, and be taken to the relevant reporting tool. A proportion of these reporting tools require user registration and a sign-on to access.

Quality assurance of knowledge products

Robust metrics, indicators and evidence can only be delivered with a deep understanding of the raw data and its provenance; issues of data quality are often only apparent once the data are used. Therefore the link between the original data and the

¹⁶ http://www.libraryservices.nhs.uk/document_uploads/LQAF/LQAF_Version_2.2_April_2012_90e8f.pdf

¹⁷ <http://datagateway.phe.org.uk/>

generation of outputs needs to be close and should, whenever possible, be within PHE so that there is shared ownership.

As described in the PHE Quality Framework for Surveillance, the utility and value of outputs is determined by the confidence that users have in their quality and robustness. PHE will seek to provide this assurance through the application of methods and tools to describe quality. Where appropriate, the concept of self-assessing quality will be encouraged as data providers are often in the best position to know the strengths and weaknesses of the data that they supply. PHE will explore the following mechanisms to support this:

- quality statements – a data quality statement is a presentation of information about the quality of a data item or collection of data items. Its purpose is to clearly communicate key characteristics of the data that impact on quality, thus ensuring that potential users or recipients of outputs can make informed decisions about fitness for use (NSS). The statements should report on both the strengths and limitations of the data and components should include relevance, timeliness, accuracy, coherence (comparability and compatibility), interpretability and accessibility. For example:
 - **coherence:** the degree to which data derived from different sources or methods can be reliably combined or have been combined to build a picture of the phenomenon being studied
 - **accuracy and precision:** the closeness between the value finally retained (after editing, estimation, imputation etc) and the true, but unknown, value. The larger the error the lower the accuracy
 - **comparability:** the degree to which data can be compared over time, domain and to similar data from different sources
- quality flags – the flagging of quality levels can be achieved through the presentation of symbols, providing a quick assessment of quality¹⁸
- metadata – All generic outputs that are generated should be presented in a standard format with their associated metadata. Metadata is data that provides information about other data. It can consist of details about a source of information, the length or timeframe of validity of an output, publishers etc
- kitemarking – a kitemark is a demonstration of certification. For example, NICE has established an approach to accredit an organisations ability to reproducibly produce high-quality evidence and information

How will this work in practice?

A member of staff working in a PHE centre is interested in presenting a new indicator on the dietary habits of children and young people to help inform local commissioners. In collaboration with their local KIT they propose a new indicator that is successfully

¹⁸ Definition sourced from the National Statistical Service - <https://www.nss.gov.au/dataquality/abouttool.jsp>

adopted and presented nationally. The member of staff, now owner for the indicator, contacts the library services team to identify the evidence on cost-benefit analysis of interventions designed to alter dietary habits through child and parent behaviour changes and commissions the library to develop a short synopsis aimed at commissioners to explain where best to direct limited resources in order to tackle this particular problem.

The new knowledge products described in this example helped PHE support local commissioners with the evidence base to apply resources where they were able to provide the greatest return on investment. As a result, PHE's fourth priority: *Supporting families to give children and young people the best start in life, through working with health visiting and school nursing, family nurse partnerships and the Troubled Families programme*, was addressed.

Metrics

PHE will know it has succeeded when knowledge about public health interventions is readily available to answer questions, and information and evidence developed anywhere in the community rapidly becomes common knowledge and is used elsewhere.

Research in knowledge and information science has been undertaken to consider ways of defining value. This has included the use of measures of purchase or exchange value, but more importantly in use value. Value has also been expressed in terms of economic, social and environmental factors.

PHE will be active in ensuring that knowledge transfer is measured using a variety of approaches including: implied value (ie portal activity metrics, downloads); explicit value (ie outcomes, critical incident) and; derived values (ie contingent valuation, return on investment (ROI) measures).

PHE will be committed to go beyond usual measures of implied value to those that measure use and outcomes. In summary, multiple methods will be used to measure value, and these should: be informed by PHE's mission and purpose; measure outcomes and; use quantitative and qualitative data.

In order to map measures against core user purposes, PHE can build on the use cases and information needs analysis to develop "personas", fictional characters built on actual user data can also be used as a tool to represent target audiences, putting a personal "face" on categories and stakeholder data.

Value is demonstrated by time invested, by value to purpose, by outcomes of use and by ROI. We recognise the challenge in being able to measure value further along the

knowledge translation pathway, but also that this represents the most important measure.

Key measures:

- development of new knowledge products
- development and application of quality standards to those products
- high levels of user contentment with those knowledge products
- evidence that knowledge products underpin and inform public health action
- evidence that knowledge products have an impact on improving and protecting the public's health or reducing inequalities

Priority 5: Build and develop health intelligence networks

Vision

PHE will co-ordinate the creation of Intelligence Networks for Cardiovascular Disease, Mental Health, and Children, Young People & Maternity to deliver information, data, best practice, evidence and predictive models to support strategic decision making. These networks will be built on existing strengths in PHE and from external partners in the NHS, academia, the third sector and industry to support knowledge sharing across the whole field.

Approach

High-quality intelligence is critical to improving the health of the public, in promoting good health, preventing ill health and when people do get ill, ensuring they are treated well and return to as active and healthy life as possible.

PHE collects, analyses and publishes information required by the public, local public health teams, communities, commissioners, providers and clinicians to help them make appropriate decisions. However the role of PHE is to deliver the highest quality intelligence possible, and PHE recognises that it cannot do that alone.

Experience in cancer and end of life care has shown that a networked approach, working beyond organisational boundaries, delivers real benefits. The National Cancer Intelligence Network and The National End of Life Care Intelligence Network, now hosted by PHE, are examples of what can be done working with funding partners in innovative and supportive ways to develop and deliver intelligence across the whole pathway, reducing duplication and delivering with better co-ordinated use of resource.

PHE has committed to develop new Intelligence Networks with our strategic partners in three additional key areas, selected to best serve the new Strategic Clinical Networks. These will be in the areas of Cardiovascular Disease, Mental Health, and Children, Young People & Maternity. PHE has a significant contribution to make in each of these areas, but we recognise that our strategic partners may have even more. Our commitment therefore is to recognise where these strengths exist and work in partnership to build upon them. In particular where strong leadership and expertise already exists, we should ensure that we do not simply replicate this, but ensure that our role within the network is to augment it.

One key element of intelligence networks is the ability to bring disparate datasets together for the benefit of all partners. PHE will facilitate the linkage of these datasets to support the development of new knowledge in line with principles and standards described under priority 3.

PHE will identify national directors for each of the three new networks and establish a list of partner organisations to collaborate with. Strategies and business plans for each network will be developed and national annual meetings will be set up to support knowledge sharing and share best practice.

How will this work in practice?

Diabetes UK is preparing a nationwide health promotion campaign to raise awareness of the nine key care processes that everyone with diabetes should receive each year. As part of the campaign structure the charity wants to use the latest data from the National Diabetes Audit. The charity needs to ensure the research is easily understood by its target audience, which consists of non-healthcare professionals and people with diabetes as well as the general public. The National Cardiovascular Intelligence Network is informed through its strong links with the charity and offers support through a research analyst who works closely with the National Diabetes Audit data. As the research analyst has an in-depth knowledge of the data on diabetes care they are able to work with Diabetes UK to identify the pertinent issues and data to be used and can advise on the appropriate use of the data. This collaborative working results in establishing clear, concise, robust and relevant messages that are used in the promotion campaign materials disseminated widely to the general public, care professionals and people with diabetes.

Metrics

Priority 5 is all about strengthening partnerships with external bodies able to help tackle specific public health problems. The area is necessarily developing and outcomes-based measures will be identified in due course on a network-by-network basis as they become established. Until that point a number of provisional output-based metrics have been identified.

- national intelligence directors will be identified
- national annual meetings will be arranged
- steering groups to establish intelligence requirements will be established and those requirements published with an action plan to meet them being built into a strategic direction for each of the three networks

Priority 6: Extend the use of surveillance to inform health responses

Vision

In five years' time, PHE, the NHS, local authorities and others, with appropriate access permissions, will be able to view and manipulate outputs from any surveillance system operated by PHE. These outputs will provide real-time information on disease events, exposures and hazards. This is the vision for surveillance set out in the Department of Health's *Towards a Surveillance Strategy* document¹⁹.

It is acknowledged that public health decision making depends on three types of knowledge: surveillance, research and experience. Surveillance knowledge includes statistics that measure health outcomes, healthcare performance and other determinants of health²⁰. There therefore needs to be a good understanding of how to both interpret and effectively communicate these three complementary types of knowledge through various forms of communication routes including formal surveillance reports or bullets, annual reports, conferences, media releases and web based tools.

The aim of the surveillance strategy will be to strengthen and deliver high-quality surveillance systems to support and enable key policy and operational goals making the best use of modern technology and the synergies offered by PHE. This will be achieved by ensuring that surveillance is integrated within this broader knowledge and information strategy enabling the benefits of the knowledge that is derived from surveillance to be fully realised.

Approach

The priorities required to implement a comprehensive Surveillance Strategy have been identified through the Department of Health's "Towards a Surveillance Strategy" document and associated Implementation Plan. These are reflected in the PHE corporate programme for surveillance which identifies a number of key deliverables for 2013/14. These are:

- to confirm the national health surveillance strategy for England
- to undertake a stock take of existing national health surveillance systems to provide assurance that the high level surveillance requirements of England are being met

¹⁹ <https://www.wp.dh.gov.uk/publications/files/2013/01/Towards-a-Public-Health-Surveillance-Strategy.pdf>

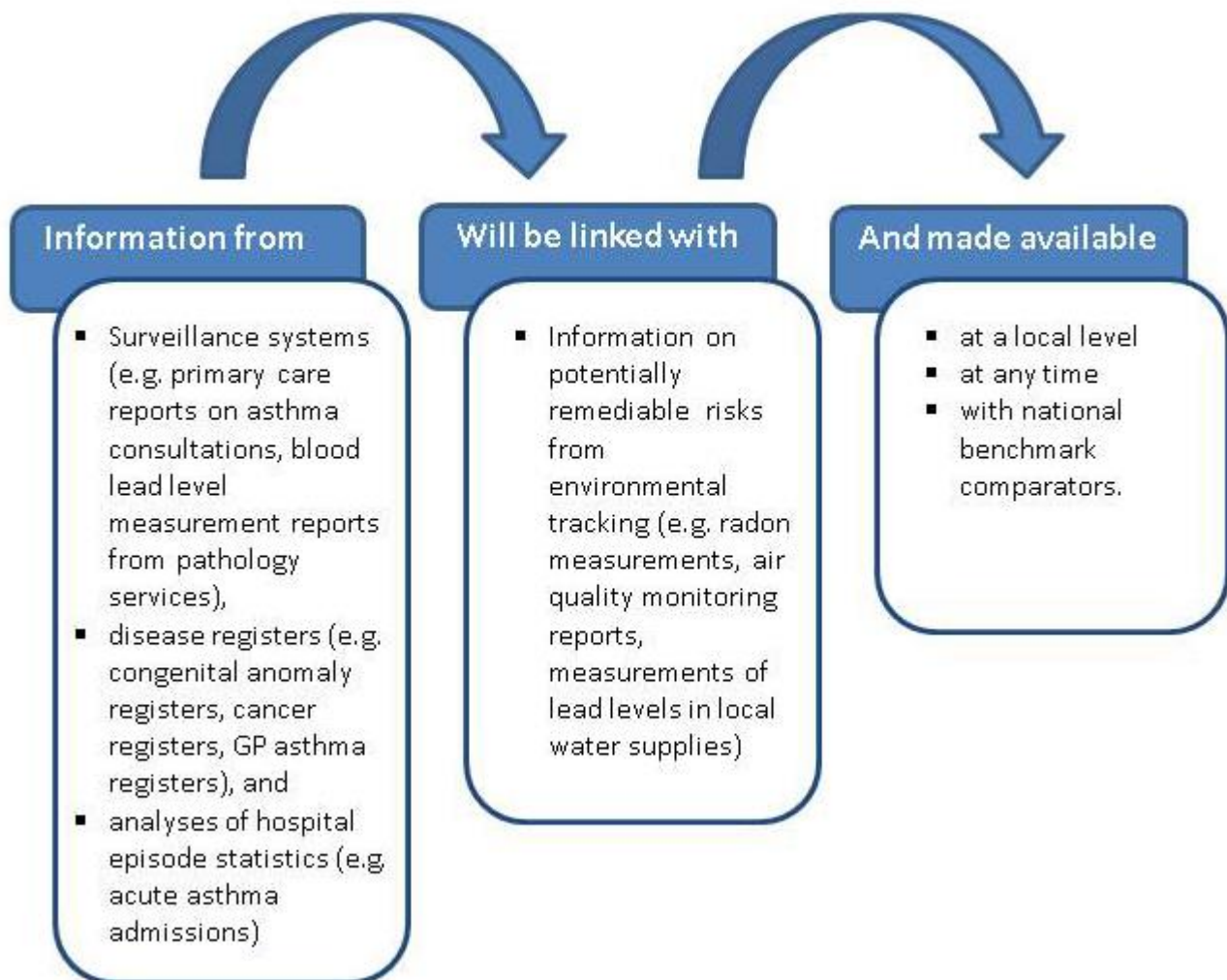
²⁰ Bernard C. K. Choi, "The Past, Present, and Future of Public Health Surveillance," *Scientifica*, vol. 2012, Article ID 875253, 26 pages, 2012. doi:10.6064/2012/875253

- to identify gaps in current surveillance systems that need to be filled and to develop a clear case for new surveillance programmes or systems required.
- to identify any modifications or withdrawals that are appropriate for existing surveillance programmes or systems, especially those that are inadequately evaluated or of doubtful effectiveness, quality, or value
- to agree standards for surveillance programmes and a plan for their implementation

How will this work in practice?

A director of public health who is inputting into joint strategic needs assessments and joint health and wellbeing strategies undertaken through health and wellbeing boards will be able to view and download outputs (at any time) that provide an up to date analysis of morbidity or mortality, for diseases of public health importance along with an integrated analysis of surveillance data on environmental or behavioural risk factors for those diseases.

Figure 3: Data linkage to support surveillance



Metrics

Surveillance is an important activity within PHE but it is not independent of other data collection and information analysis and presentation functions. The following output-based metrics have been identified as surveillance specific interpretations of the more generic commitments to efficiency through the adoption of non-mandated standards and openness explored in the introductory chapter of this strategy:

- standards developed for surveillance systems (design, development and operation)
- standardised outputs are agreed including core content
- surveillance outputs are presented according to the systems standards agreed

Priority 7: Connect people to share experience

Vision

Knowledge management encompasses both a collecting and connecting dimension. The connecting dimension involves linking people with people – specifically people who need to know with those who do know, and so enhancing tacit knowledge flow through better interaction, so that knowledge is diffused around the organisation, and wider system, and not just held in the heads of a few. Connecting is necessary because knowledge is embodied in people, and in the relationships between people within and between organisations. Information becomes knowledge as it is interpreted in the light of the individual's understandings of the particular context.

PHE will meet this priority by providing tools, information and opportunity to connect public health professionals to enable the sharing of information. In particular PHE will encourage the sharing of tacit knowledge gained through experience and best communicated from person to person.

Approach

PHE will take an integrated approach to managing knowledge, achieving a balance between collecting what is known, and connecting individuals to share, create and use both explicit and tacit sources of knowledge.

Although some knowledge and experience sharing topics will be of use only to PHE staff, the principles, technologies and tools will be used to connect all with an interest in public health. The same technologies developed to support internal discussions to PHE will be accessible to the wider public health system to identify experience and expertise, share ideas, techniques and evidence.

One specific example of connecting people for a specific purpose is the creation of intelligence networks. PHE will explore the use and development of other knowledge tools to encourage the sharing of experience. These include:

- create a regular knowledge, informatics and data seminar/webinar series through which best practice and cutting edge ideas can be cascaded and discussed
- skills and expert directories – searchable online staff directories that give much more detail about who does what and who knows what
- communities of practice – networks of people with a common interest
- events designed to support the sharing of knowledge and experience

- the importance of culture and language will be recognised through access to reading and journal clubs.
- a glossary will be developed as a learning and sharing tool
- mapping and documenting key stakeholders and networks, using existing networks and channels where possible to avoid duplication and aid sustainability

How will this work in practice?

A newly appointed local emergency planning and liaison officer, working in a city-centre district general hospital, is trying to formulate the emergency response plan for her trust. Through contacts in her local PHE centre she has identified national experts within PHE and reviewed some of the guidance developed by a community of practice facilitated by PHE but led by other trust-based emergency response leads. As she develops her own processes, she tests out methods shared by others and improves on them, sharing them through the community with others in a similar position.

Metrics

In principle, effective sharing of knowledge prevents the organisation from unnecessarily duplicating effort and speeds up the delivery of outputs as well as delivering more effective outcomes. In practice, this improved use of resources is difficult to measure. The following metrics are proposed as proxies for resource savings that may be expected from the introduction of knowledge management techniques to share knowledge from experience:

- the number of actively used forums and communities of practice
- the number of published methodologies
- the number of published and approved standards
- user (staff) satisfaction

Priority 8: Develop a web portal to report and provide access to information and evidence

Vision

The internet and the use of web technologies have made it phenomenally easier to deliver information in the way users want it. This focus on user needs has meant that complex information can be packaged in an infinite number of ways to help inform decisions.

The PHE digital strategy, incorporating the development and function of the PHE website, intranet and other forms of digital presence is currently under development. The role of the PHE digital strategy will be to ensure that public health decisions can be made quickly using the best available evidence. The strategy will ensure that public health professionals responsible for presenting information and developing tools using web technologies can do so as easily and to as high a level of quality as possible.

Approach

The digital strategy will take account of the following user requirements:

- **digital by default:** where services can be provided by electronic means they should be in order to reduce cost and improve efficiency
- **easy to update:** the processes required to author and edit content on the intranet and internet should be easy and quick. Governance should be seamless and largely invisible to the user
- **establishment of a skilled centralised digital team** to underpin the on-going and future delivery of digital service outputs

Reactive to users' needs:

- **constantly seeking feedback:** to ensure constant improvement, products, services and information placed on the intranet and internet should be rate-able, allowing users to contribute to our development
- **present all data:** the website should be able to present the data and information we need to present it in the forms our users find most useful. This work will be led by the indicators sub-strategy. Web technologies will be the vehicle by which PHE meets its responsibilities for publishing Open Data

- **present all knowledge and evidence:** the web should be the primary technology to support access to the knowledge and evidence generated by PHE, which will include the methods, standards and policies produced by PHE to support consistent practice
- **support communities of practice and knowledge sharing:** web technologies will support internal and external groups, collaboration, document sharing and discussion
- **reduce bureaucracy:** the intranet will use technologies such as single-sign on to reduce the amount of time users take to perform administrative tasks traditionally met through the use of forms, such as recording/requesting leave and gaining approvals

How will this work in practice?

The digital strategy is very much in formation and will form a key output of the 2013/14 Digital Programme. The strategy will put users first and central to any solution development and delivery. This will be initially defined through the “discovery” phase of the programme.

Metrics

As part of the digital strategy, there is the consolidation of existing externally facing digital products that will be consolidated as a part of the 2013/14 digital programme. As such, there are some clear indicators for this:

- ensure all PHE digital presence is surfaced through two shop windows – .gov.uk and NHS Choices
- reduce as far as is possible, the number of existing websites to less than 25% of the existing total
- aim to increase the number of visitors to the PHE website on .gov.uk by 20% by March 2014 (against July 2013 figures)
- aim to increase the number of page views to PHEnet by 20% by March 2014. (against July 2013 figures)
- ensure 90% of PHE staff have a fully populated profile on the PHE staff directory

Next steps

The scope of this strategy is broad and so the level of detail is necessarily low. The strategy has captured culture changes, broad requirements that need to be addressed and some very specific actions that can be taken forward relatively quickly. The ethos described by the strategy is one of partnership, consultation, flexibility and innovation and this steer away from centralised micro-management of how we may achieve our strategic goals is very deliberate.

Following the publication of the strategy three activities will be undertaken. Firstly, a consultation exercise on the strategy will be performed. This will enable us to ensure that our strategy is most likely to meet the needs of our stakeholders. On finalisation of the consultation exercise we will establish an infrastructure through which cross-PHE and cross-public health system projects can be managed as part of the implementation of the strategy, hand in hand with business as usual functions and the business planning cycle. A delivery document is being developed to address some of these issues.

In parallel to these two activities we will identify areas of public health activity where corporate leadership of methods, standards and policies as part of a strategy would be beneficial. Surveillance, the PHE web presence and research have already been identified in this document as areas where “sub”-strategies need to be further established, but other areas of public health activity such as outbreak response, bioinformatics or screening are likely to require similar approaches to ensure appropriate levels of consistency and efficiency.

Together, these activities will enable PHE to implement this strategy, accepting that the approach needs to be flexible and adaptive to change. Metrics will be confirmed, measured and published to demonstrate progress.