Health & Wellbeing Best Practice & Innovation Board

NHS Social Care & Business Workstream

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Recommendations on Health and Wealth in Wales
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<td><strong>Date</strong></td>
<td>October 2013</td>
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<tr>
<td><strong>Version</strong></td>
<td>3.0 – Final</td>
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| **History** | 1.0 – First draft  
1.1 – Draft to Workstream members and key stakeholders  
1.2 – Draft to Workstream meeting (11/09/13)  
2.0 – Draft to Board meeting (18/09/13) |
| **Background** | This document has been prepared by the NHS Social Care & Business Workstream of the Health and Wellbeing Best Practice and Innovation Board.  
It has been commissioned by the Welsh Government to support health and social care policy development, focussed particularly on increasing the economic value arising from healthcare activity in Wales. |
| **Purpose** | The document recommends a number of specific policy and strategy initiatives which would support the delivery of more economic value from NHS and social care activity in Wales.  
The workstream recognises that healthcare resources are under severe pressure in Wales, as they are elsewhere. In making its recommendations, it has not attempted to prioritise proposed initiatives against existing activities and commitments. |
| **Sponsor** | Chris Martin, Chair, Hywel Dda Health Board (as co-chair of the NHS Social Care & Business Workstream) |
| **Target Audience** | Minister for Health and Social Services |
| **Contact Details** | Ifan Evans, Deputy Director Healthcare Innovation, Department for Health & Social Services, Welsh Government (as co-chair of the NHS Social Care & Business Workstream) |
Background

The Health and Wellbeing Best Practice and Innovation Board (‘the Board’) has been established by the Welsh Government Minister for Health and Social Services to accelerate the adoption of innovation and the dissemination of best practice relevant to health and social care in Wales.

The NHS Social Care & Business Workstream (‘the Workstream’) of the Board has been established to provide advice and guidance to the Minister on opportunities relevant to health, social care and business, in the following areas:

- Enabling and supporting translational research and **technology transfer** out of the NHS;
- Enabling and supporting **procurement** to deliver innovative solutions in response to needs and challenges, including more consistent adoption and diffusion of products, services and practice throughout the healthcare system;
- **Developing connected health** in Wales, including eHealth, mHealth, big data, and the development of an ecosystem which enables and supports innovation and engagement with industry;
- Making the NHS and social care in Wales **more accessible to industry** and more open to collaboration and partnerships focussed on research and innovation;
- Exploring **new models of delivery** in health and social care, particularly mutual, collaborative and social enterprise approaches.

The Workstream has interpreted this scope to recommend a range of practical and effective initiatives, with an underlying rationale for each and for the whole. These initiatives will have financial and governance implications which it has not been possible for the Workstream to consider fully, and which will need to be considered by the Minister and his officials in the context of other competing priorities and pressures within the Welsh healthcare system.

The Workstream is made up of experts from the public sector and industry. Its discussions have been supported by the Board’s Call for Evidence, by direct engagement with key stakeholders as groups and individuals, and by desktop research into practice within the UK and abroad.

The Workstream scope, membership, and a select literature are set out in Appendix 1.
Approach

1. The Board and the Workstream have based their findings and recommendations on evidence, engagement and expert knowledge. Evidence and engagement has included academic, business and clinical stakeholders, through a public call for evidence, group and workshop discussions, and individual meetings.

2. This report is intentionally brief. There is no shortage of documentation in the health and social care sector. In fact, the volume of narrative information and guidance is itself a challenge, firstly making it harder to identify the key drivers of policy and change, and secondly crowding out important new knowledge and ideas.

3. Our findings highlight only the key issues most relevant to our task, which was to consider ways in which health and wealth benefits could be more closely aligned in Wales, with a particular focus on technology transfer, procurement and technology adoption, digital health, collaboration with industry, and potential new models of delivery.

4. Our recommendations are presented at a policy and strategy level. Given the limited time and resources available, and our remit to provide expert evidence based policy advice to the Minister, we have not at this stage considered issues of resourcing, governance and structures in great detail, but have set out a number of strategic recommendations which we invite the Minister to consider.

5. Our aim has been to describe what a more effective healthcare innovation system in Wales would look like. There is always a temptation to find ‘magic bullets’ which promise to transform things quickly. Occasionally these work, but we believe that a system approach is more appropriate, particularly because most of it can evolve from existing resources, but also because it will be more resilient and better able to adapt to changing healthcare needs and technologies. Our recommendations will have a rapid impact, but we do not see them as short term fixes. A persistent approach is needed to change attitudes to innovation and industry partnership, over a period of at least 5 years.

6. We want to simplify and clarify the way that existing activities and institutions are understood, and the way they interact with each other as a system. There is now too much complexity in the system, there are too many acronyms, and too many overlapping responsibilities. One of the strong messages from industry was the difficulty in finding the right entry point to the healthcare system in Wales. We believe that this is more quickly addressed by sign-posting and clarifying the purpose of existing organisations, and by setting out a clear vision of how they work together as a system, than it is by wiping them out.
and creating a new structure. That would take years to complete, the delivery of healthcare is in more urgent need of change, and other parts of the UK have already set out their approach to jointly promoting health and wealth. A small number of clear points of entry will make things easier for external partners by concealing complexity and marshalling resources. Setting these structures out as a single system will promote a shared understanding of the functions and responsibilities of each part, which is an important first step towards removing duplication and reducing complexity.
Findings

The potential for healthcare activity to support wealth creation

7 The healthcare sector has the potential to make a much greater contribution to promoting wealth creation in Wales. This is a sector which employs over 100,000 people, with an annual expenditure of close to £10 Billion. It does not currently give enough attention to how these resources can help create more jobs growth and wealth.

8 There are valuable healthcare assets which are not properly recognised or exploited. Very substantial amounts are invested in resources like data, digital systems, equipment, property, research capacity and developing people. All of this generates valuable intellectual property, and the daily delivery of healthcare services generates enormous knowledge and information. These things are often not thought of as assets at all, and even when they are there is not much focus on how they can generate additional value for Wales and the healthcare service. In particular, they are not managed in a way that enables the healthcare system to exchange their value for external resources. This is relevant for healthcare improvement because innovation almost always requires risk capital, which our public healthcare system cannot easily generate (or use) internally. It is also relevant for Wales because the healthcare system has the opportunity to play a much greater role in supporting economic development and increasing jobs growth and wealth, as it is does in other parts of the UK.

Research and technology transfer

9 There is really good healthcare research undertaken in Wales, with world-leading excellence in some areas. As shown by successive RAE exercises, performance in this area has improved over the past few years, most likely as a result of increased levels of Welsh Government support for healthcare research through NISCHR. The Welsh Government’s Science for Wales strategy indicates a continued commitment to support fundamental research in Life Sciences and Health, which is identified as one of three priority areas. Swansea and Cardiff Universities have made major investments into healthcare research in recent years. We believe that this increased investment into research will be sustained. There are some good examples of winning competitive research funding at scale, but overall Wales performs below the UK standard, and the proportion of external research funding from industry appears to be comparatively low.
The Welsh Government is clearly committed to supporting growth in the life sciences sector. Since the 2010 Economic Renewal strategy there has been a significant increase in support for industry R&D, business growth, international trade, and sector networking and events. A new Life Sciences Investment Fund with a target fund size of £100 Million was a landmark commitment in 2012, followed by the announcement in 2013 of a new Welsh Wound Innovation Centre, a Welsh Life Sciences Hub to be located in Cardiff Bay, and the relocation of ReNeuron plc to Wales. Life sciences also claims a large part of the Welsh Government’s general support for innovation - it is the second largest sector beneficiary of support under the Academic Expertise for Business programme, with over £5.5 Million committed to date, and it is the largest beneficiary of SMART Cymru R&D support to industry, with over £8 Million committed to date. Both of these programmes are supported by European structural funds. The 2013 Innovation Wales strategy indicates a continued commitment to prioritise support for life sciences R&D and innovation in Wales, and is expected to steer future European funding programmes in Wales.

Welsh Government support for research, innovation and business growth is not well co-ordinated across departments, and does not engage with the NHS to the same extent as in other parts of the UK. Through its membership of the UK Office for Strategic Coordination of Health Research (OSCHR), NISCHR has taken steps to address the challenges described in the 2006 Cooksey Report:

There is no overarching UK health research strategy to ensure UK health priorities are considered through all types of research and there are two key gaps in the translation of health research: translating ideas from basic and clinical research into the development of new products and approaches to treatment of disease and illness; and implementing those new products and approaches into clinical practice. (pps 3-4)

However, other parts of the UK have been more successful in delivering engagement with the commercial sector as an essential part of research activity. Through Academic Health Science Networks in England and policy statements in Scotland and Northern Ireland, they have also set out their intent to link healthcare improvement to wealth creation more clearly than Wales, including documented partnerships between government health and economic development functions. Currently, there is in Wales no such overarching healthcare research and innovation strategy (i.e. health organisations, higher education and all parts of government), and so no systematic approach to supporting the translation of research and discovery into better healthcare services and wealth creation.

Wales does not always capture long-term economic value from its funding for research. There are significant employment and patient benefits from trials and other research, which we do not discount, and NISCHR’s investment in research infrastructure and supporting
trials activity develops an important capability to undertake future research activity. However, where this research is led from outside Wales, there is limited scope for creating future value. Delivering a small part of a large multi-site trial does not generally advance Welsh-owned intellectual property, or enhance prestige and reputation in ways that will attract inward investment to Wales. We need to move from delivering to leading research activity.

13 NISCHR funds excellent research, but this could deliver more applied benefit in Wales if there was a clearer focus on driving a translational pathway to better treatments, improved services or economic value, aligned to areas of need or opportunity in Wales. NISCHR is becoming more systematic in seeking potential for impact and the translation of research outcomes into patient or economic benefit, following UK research funders such as the Wellcome Trust, NIHR and MRC. Each AHSN in England has identified priority clinical areas which are considered to be most relevant to healthcare need and opportunity within their own geographic area. By maintaining an applied focus for their research and translation activity, this is intended to deliver improved services and patient benefits more quickly, and in areas of need. Similarly, the restructuring exercise within the NISCHR infrastructure planned to be fully implemented by 2015 will provide opportunities to strengthen alignment with Welsh priorities.

14 NHS organisations in Wales have not implemented a consistent IP management policy, prominent technology transfer function, or structured approach to industry engagement. Ideas for technology innovation in healthcare usually come from the front line, but for new products and services it is not clear how this invention and knowhow is captured in Wales. There is no mechanism for supporting or accelerating ideas and invention to proof of concept and applied demonstration, or to commercialisation. At the other end of the innovation pathway, there is overall no managed or systematic approach to technology appraisal and adoption into the NHS.

Procurement and Technology Adoption

15 The shared service approach to procurement in Wales is an asset. Because it provides transactional services to all healthcare organisations in Wales, shared service procurement generates cost and volume data which is both granular and comprehensive. Such data is potentially valuable. The procurement service is also a single point of entry to the NHS for products and services, which has the potential to drive technology adoption on a national basis.

16 There is scope to increase the proportion of NHS spend on products and services in Wales. Supply chain development, linked to the concept of the NHS as an ‘anchor company’, could increase NHS procurement spend in Wales, but the main emphasis should be on improving
the capacity of Welsh business to compete for NHS business, rather than softening requirements for them. In healthcare terms, Wales is a small scale purchaser, so the real value of NHS Wales procurement is its potential to act as a stepping stone to much larger UK and global markets. Where procurement regulations allow, NHS Wales procurement could work closely with Welsh SME suppliers on a ‘developmental procurement’ basis, using tools like the Technology Strategy Board SBRI programme, building capacity within individual businesses and clusters, and specific projects like the health app development fund collaboration between Creative England and the NHS.

17 Technology appraisal and evaluation must sit alongside but apart from procurement. Procurement processes are tightly controlled and regulated, but technology innovation needs to be agile and unstructured, encouraging co-production of new products and services by industry and healthcare professionals, to address unmet clinical needs, and to improve healthcare services. There is a benefit to procurement being an integral part of the innovation, appraisal and adoption process, but there also needs to be a separate focus on differing purpose and priority - technology innovation should be driven by invention, experiment, speed, risk and co-production with industry, but technology adoption needs transparent procurement driven by quality, safety, cost and value. An integrated approach must ensure value for money within the health sector, balancing better clinical outcomes for patients with more economic and cost effective solutions, as well as making Wales a more attractive location for innovative businesses. The economic value opportunity to Wales is to deliver faster and more open technology appraisal and evaluation than other healthcare systems, encouraging industry to innovate in Wales rather than elsewhere. This also offers potential healthcare benefits as new technology is taken up more quickly into the NHS in Wales.

Digital Health

18 The digital systems architecture developed in Wales is an asset. We were advised that digital infrastructure in Wales has a modular system architecture which enables individual applications and subsystems to be more easily introduced, changed, removed and replaced than in a single integrated system. This has major benefits such as more interoperability between systems, better control of data exchange and information flow, fewer dependencies and more resilience. A standards based approach with clear access and integration specifications enables easier and faster innovation by a wider range of independent third-party developers. Digital healthcare is a very large market, and it is the key enabling technology for healthcare innovation, so these characteristics have the potential to attract businesses to innovate in Wales.
Knowledge derived from big data is the foundation of innovation in healthcare. Public and patient health data is already used extensively for research. Genetic and genomic information at scale will play a key part in the development of more personalised medicine, companion diagnostics, and in selecting the cohorts needed to trial these new technologies. It is increasingly clear that this will become critical to regulators and to healthcare management and improvement in the next decade. Administrative data is essential to changing the way that healthcare services are delivered, and to the adoption of new technologies, because providers need to understand care pathways and costs in more detail and with more confidence if they are to make big changes to the way services are delivered. Suppliers want to understand healthcare costs, outcomes and volumes in more detail so that they can target areas where their technology delivers irresistible savings and improvements. Everyone wants healthcare services to be simultaneously better and cheaper with more focus on prevention and better outcomes, and detailed administrative data is the only way to evidence that properly, pathway by pathway.

Wales has world-leading expertise in managing complex e-health data at scale for research use. Swansea University’s excellence in this area is recognised by the recent announcement of winning almost £10 Million of competitive research funding from the MRC to establish the Farr Institute for population health.

Wales has the potential to collect healthcare data at population and system scale. Because of its scale, expertise and existing systems, Wales has the potential to assemble data covering a high percentage of population. For example, the SAIL e-health data platform extracts patient data from around half of GP practices in Wales, which is a very high proportion compared to other parts of the UK. There is continued investment in raising this coverage to a target of more than 70%, but in Wales this data is given voluntarily, whereas in England there is a statutory right to extract patient data from GP systems, with a stated aim of reaching at least 75% coverage by the end of 2013. Wales is making much slower progress than England in establishing a genomic data infrastructure, and we understand that its central collection of HES and other service and performance data is comparatively poor because reporting by health organisations is often delayed, inconsistent and irregular.

Collaboration with industry

There is a perception that the Welsh healthcare system is not responsive to business. This was a strong theme in the evidence submitted to the Board, in which business respondents described their experiences of the public sector being unwilling to engage with industry, being difficult to access with no clear points of entry, having a slow-moving risk-averse culture and ‘speaking a different language’ to business, and not having appropriate tools for
working with industry due to restrictions on contracting and joint ventures or inappropriate policies in key areas like governance and IP management. There are individuals who work productively with industry, and examples of collaborative projects, so it may be that this perception is related to a lack of scale, low profile projects, or not having a systematic approach to working with industry.

**Industry is an essential partner for healthcare innovation.** There is strong evidence that major innovation usually comes from outside large systems and organisations. One particular factor is that public healthcare systems do not support risk capital, which we take to mean both placing financial resources at risk and putting personal reputations on the line with an organisational tolerance for failure. There is also a question of scale – most large organisations suffer from silo budgeting, bureaucratic overhead, remote decision-making, and organisational rigidity and inertia. Smaller organisations which have clarity of purpose, focussed and strongly incentivised teams, and access to capital are much more likely to drive innovation. These are exactly the type of business which economic development policy most wants to support, and which offer the greatest potential economic value to Wales if they locate and grow here.

**Healthcare systems are essential partners for healthcare innovators.** What businesses need more than anything is to fully understand healthcare practice, at policy, management and front line levels. They want to know about unmet clinical need and ideas for solutions which will address them. They want to co-produce and to develop products and services jointly with healthcare professionals. They must conduct studies and trials to prove safety and efficacy. They need to demonstrate to purchasers how their new technology will deliver better outcomes and/or reduced cost. Businesses must have access to patients, staff, systems and data to develop and improve their products. Fragmented systems make this very difficult, so the Welsh healthcare system is potentially very attractive to industry partners, because it is a fully integrated policy payer and provider, with a small number of health boards delivering primary secondary and tertiary care, and a single policy department covering health and social care.

**Healthcare innovation delivers shared value.** Healthcare providers and business seek the same goals of better quality and more efficient healthcare services. The public and patients share in this value also. Although individual businesses are profit-seeking, they compete with each other, particularly by developing products and services which offer better value for money to purchasers. This is to the overall benefit of healthcare providers and patients. As in all large organisations, there is sometimes evidence of poor negotiation skills on purchasing, commissioning and contracting, but that risk must be managed in other ways than closing out business entirely.
Public value should have primacy over commercial interests. It is important that public value is considered more broadly than the direct interests of public healthcare providers. For example, supporting the creation of jobs growth and wealth, strengthening the research base in Wales, and changing the structure of the Welsh economy are all priorities for the Welsh Government. There is of course a tension between public and commercial value in collaborative healthcare innovation, typically in areas such as the ownership and management of jointly-developed intellectual property, and the sharing of benefits from partnership projects. It is also difficult to place a fair value on access to the healthcare environment, on the use of healthcare assets, or on the focus and drive which businesses can deliver. However, it is important that the public sector should manage this tension, rather than avoiding it by closing its doors to collaboration with commercial partners. This will be done most effectively and robustly by focussing expert knowledge and experience in one place, which will ensure consistency and will enable transparent governance and oversight of industry collaboration across the healthcare sector in Wales. Such an approach is also more likely to develop the professional authority and robust evidence which is needed for holistic budgetary consideration of innovative products, which in some cases could be more expensive than existing products or services but would overall provide a more cost effective solution when wider benefits are considered.
Our recommendations are intended to make progress towards a Welsh health and wealth system, presented above as a diagram and described in more detail in the next section. We think that the concept of a system is important in developing a shared understanding of how different aspects of healthcare innovation fit together across the healthcare system and external partners, including industry. This will provide a strategic map onto which existing activity and new initiatives can be drawn, helping to avoid duplication and to clarify interactions between them.

Because the recommendations are tightly integrated with each other, we have found it difficult to prioritise them as a set of standalone initiatives without undertaking a more detailed consideration of resource requirements and potential benefits. Our advice at this stage is that prioritisation should be considered mainly in terms of timing and scale, making progress as quickly as resources allow towards a system approach. Where there is no
alternative, starting to deliver services should have precedence over establishing new
organisations, and some activities could be started as a ‘minimum viable product’ to enable
rapid testing and incremental improvement before launching at scale.

29 We recognise that there is a great deal of pressure on services, particularly in health and
social care, but our view is that there are major assets and opportunities which are not fully
realised, and there is significant potential to deliver increased economic value, more
efficient services, and better outcomes for patients. Based on the scale of this activity in
other parts of the UK, which has made considerable progress over the last two years, we
think it is both achievable and important for Wales to have a structured approach to health
and wealth, based on our recommendations as set out below.

Publish a statement setting out a clear vision for improving health and wealth in
Wales

30 This document needs to put beyond doubt that Welsh healthcare is ‘open to business’, and
it should clearly describe the healthcare innovation system in Wales, so that roles and
functions are better understood. This will help external partners to access the right people
more quickly. Internally it will help to reduce complexity and duplication, bringing more
clarity to policy development and delivery, and strengthening performance management.

31 Our advice is that the statement should establish ground rules for industry engagement and
collaboration. This will give academic, business and clinical partners direction, guidance
and reassurance on how public and commercial interests should be appropriately balanced.

32 It should also describe how wellbeing contributes to improving health and wealth. Lifestyle
changes, prevention of illness, anticipatory treatments and self-managed care all contribute
to improving population health, reducing demand for healthcare services and enabling
people to remain economically active and productive. Developing new interventions in this
area and demonstrating their effectiveness offers very significant shared value, which
includes clear public benefit.

Ensure this vision is delivered across the Welsh Government and public sector

33 It is critically important that there is ‘follow through’ to delivering this statement with pace
and credibility. We think that recent Life Sciences initiatives are already changing
perceptions of Wales externally, and our advice is to build on this foundation. The planned
Life Sciences Hub should become the gateway to the healthcare system in Wales for all
external stakeholders, and also a shared location for all internal partners. Alongside the
Life Sciences Sector Team, it is therefore essential that the NHS, NISCHR and the
Department for Health and Social Services have a credible presence in the Hub.
Universities should also be very strongly encouraged to have permanent representation. This co-location of the public sector will we believe deliver more meaningful ‘joined up government’ and also make more rapid progress towards a genuinely shared understanding of how to promote health and wealth in Wales.

Align healthcare research funding priorities to potential for translation and impact

Our findings are that healthcare research funding in Wales generally places less emphasis on the potential for impact and translation than in other parts of the UK. There should be a clearer understanding of how the outcomes of funded research infrastructure and activity can help address the healthcare challenges we face in Wales, without compromising research quality or excellence. We should encourage a focus on innovations that lead to reduced overall cost in the health care system and to better outcomes for patients. From an economic value perspective, we believe that industry funding for research has advantages over research council funding, because it is likely to be more focussed on applied benefits, and is more likely to retain or attract inward business investment to Wales. We should not trade one for the other, but neither should we discount industry research funding as somehow less prestigious – joint public-private funding should be seen as the gold standard, delivering maximum return on investment in publicly funded research.

Continue to invest in and support e-health data to a whole population level

There is excellent e-health data in Wales, but the distinct value of this asset will be eroded as other parts of the UK raise their population coverage. Because of its scale and the structure of its healthcare system, Wales has the potential to reach full population coverage. It must build on its current leading position to stay ahead of other regions and cement its reputation. A key factor in achieving this is placing the extraction of patient data from GP surgeries on a more stable footing, through contractual or legislative arrangements.

Proposed investment in genomic data infrastructure should also consider the potential for Wales to clearly position itself as a system which has whole population data. There is significant shared value in linking e-health and phenotype data to genomic data at a population level.

Further consideration should be given to how people in Wales can be more directly engaged in the collection and use of e-health data for research purposes, including for clinical trial cohort selection. The concept of a pre-consented national cohort for clinical research in Wales, supported by comprehensive health records, linked to genetic information and to patient reported outcomes, is a very powerful one. The concept of a
population cohort could also help to develop public understanding and engagement, supporting the aim of co-producing healthcare service improvement in Wales.

**Improve the quality of service and performance data reporting and management**

38 Poor administrative data hinders performance management, slows change, and acts as a barrier to technology adoption. It is critical to the daily management of healthcare services, to identifying trends and variability, to baseline and benchmark comparison, to performance management, to targeting improvement and cost saving initiatives, to adapting models of care and adopting new technology, and to evaluating the impact of change. Without good data, we are all flying blind.

39 The potential value of this data for research and innovation is enormous. Wales already has whole-system purchasing cost data. Welsh administrative data can be more granular, transparent and comprehensive because of the comparatively simple and integrated structure of our healthcare system. Because Wales has real expertise in managing big linked datasets for research purposes there is a clear opportunity to develop the best care pathway modelling in the UK, which would transform the management of change for healthcare services in Wales, and help make Wales the destination of choice for healthcare innovation.

40 Our advice is that the key factors in achieving this are firstly improved ‘big data’ technology and secondly a clear direction to all healthcare organisations that they must collect and share data which is accurate, consistent and comprehensive, as close to real-time as possible. There also needs to be a planned approach to developing data management and analysis capacity within the healthcare service, so that data is routinely used as real-time management information and as evidence for improvement and strategic planning. We support the principles of ‘open data’, but the selection of datasets for routine publication should take account of their potential value for academic and commercial research use.

**Establish a dedicated technology adoption gateway service**

41 The Board has already issued guidance on technology adoption systems, which sets out how healthcare organisations in Wales should more systematically appraise and evaluate new healthcare technologies. A healthcare technology fund also funds large capital items which improve services and make them more efficient. Wales has expertise in technology appraisal and testing, through CEDAR and SMTL. The Welsh Government has committed to increasing its use of and support for challenge procurement methods like the Technology Strategy Board SBRI programme.
42 We think that technology adoption should be tightly integrated with procurement policy and delivery but should have a clear operational independence. This is for a number of reasons, including the need to collaborate closely with industry and to move at pace. These functions require sustained close partnership working with industry, which may pull against a tightly structured and regulated procurement function.

43 Technology adoption services should also operate as a single shared or arms length service. This would help to focus expertise, to act as an observatory of best practice across the Welsh healthcare system, to identify and address variability between organisations, to engage with other technology adoption and healthcare innovation hubs, to be the ‘front door’ for technology adoption in Wales, and to promote Wales internationally as a location for healthcare technology innovation. We have also considered the possible advantages of embedding technology adoption in all organisations, and have concluded that technology adoption is more likely to achieve system-wide outcomes if it is protected from having to compete against daily pressures on resources and management.

Establish a digital healthcare gateway to promote and manage access to digital systems

44 Digital technologies are major enablers of change in healthcare. Good data and digital systems improve performance, increase efficiency, support clinical decisions, reduce errors, maximise the use of resources, and offer many other potential benefits for healthcare providers. Mobile and digital technologies are essential components of shifting healthcare delivery from hospital to clinic, surgery, community and home, and of encouraging and supporting patients to manage their own care. Combining software and sensors will improve the monitoring of health and wellbeing, supporting anticipatory healthcare and preventative medicine.

45 For a variety of reasons, healthcare has globally been very slow to adopt digital and mobile technologies. Large, closed, integrated systems architectures do not fit with the open digital ecosystems in which small startups and software developers create disruptive and innovative digital technologies. There is an increasing emphasis on the need for interoperability and standards-compliance (in England the Health and Social Care Act includes new powers to set and to enforce such standards). Wales has an opportunity to exploit its comparatively open digital systems architecture and to take a lead in promoting interoperability and defining standards. This will create an environment which will attract developers to innovate in Wales, delivering shared value.

46 This approach also offers scope to promote direct access to electronic health records by patients and the public, which is an essential part of encouraging and enabling people to
take more responsibility for their own wellbeing and care. More and better anticipatory, preventative and self-managed healthcare care is critical to reducing forecast healthcare demand.

47 Wales has probably the largest concentration of medical technology and device businesses in the UK. It also has strong clusters in aerospace and automotive, the most advanced users of sensors and telemetry. It has a strong creative and software cluster which understands user experience, engagement and gamification. Linking these elements together has the potential to create very significant shared value for all of these sectors, as well as for the healthcare system and for patients.

Establish a knowledge transfer organisation at arms length from healthcare services

48 A knowledge transfer organisation should lead and co-ordinate industry engagement across the whole healthcare system, helping to accelerate access, increase scale, and improve outcomes. A single service would provide the ‘front door’ that industry is asking for, would focus knowledge and experience, and would manage the balance between public and commercial interests with more confidence and consistency. Being at arms length from the healthcare service has a number of benefits already set out for other recommendations above.

49 One key function would be to clarify and simplify intellectual property management. This is currently inconsistent across healthcare organisations, and is often confused because many clinicians have more than one employment and/or activity outside the public healthcare service. Also, not all ideas are good ones – typically organisations will strongly encourage and incentivise new ideas and inventions, but only around 10% of these will have potential application, and even fewer will be commercially viable. It is difficult to maintain enthusiasm for offering new ideas when you say “no” to almost all of them.

50 Our advice is that these two challenges could be resolved by ‘buying’ IP into a knowledge transfer organisation, using an ‘innovation challenge’ approach. This would raise awareness and understanding by inviting all healthcare staff to come forward with new innovative ideas. These would be considered by a ‘dragons den’ style panel. A small proportion of ideas would be ‘bought in’, providing an upfront payment to the inventor and to their host organisation(s). This would provide legal clarity over the ownership and management of intellectual property, would provide an unambiguous decision on whether or not to progress the idea, and a clear incentive to individuals and organisations to bring forward innovative ideas. Framing this in a well understood challenge model will also promote understanding and awareness. For IP management, a single knowledge transfer organisation also offers
the potential to create synergy value from complementary ideas which originate in different organisations, including IP licensed from external partners on an open innovation basis where it creates further value. Our advice is that initially healthcare organisations should not be compelled to channel their intellectual property through this service – it needs to be attractive to them on its own merit.

Establish a healthcare innovation fund to accelerate technology innovation

51 The Cooksey report identified a number of gaps in translation which have not been systematically addressed in Wales. The Welsh Government has clearly committed to significant investment in fundamental healthcare research and the life sciences industry. It is very important that we bridge the gap between these two ends of the innovation pathway.

52 Our advice is to use an approach based on established models such as CIMIT in Boston and MaRS in Toronto. These seek to accelerate the development of products and services from initial idea to a stage which will attract commercial investors. Typically there is funding for a proof of concept and IP protection phase, and then for more promising products and services a combination of development funding and experienced hands-on management, which turns the concept into a credible investment proposition. Over the past decade, the gap between seed capital and venture capital funding has widened, leaving a gap which is known as the ‘valley of death’ for technology innovation. Bridging this gap would strengthen the pipeline of opportunities for the Welsh Life sciences Fund, Finance Wales, and other investors.

53 The current ‘sunset review’ of around 60 healthcare innovation initiatives in England will also offer useful learning. The anticipated closure of some of these organisations means that there will probably be very experienced people seeking new employment, which is also a potential opportunity for Wales.

Support ‘centres of excellence’ to link service delivery to knowledge transfer

54 Our ambition is that healthcare in Wales should become an engine of innovation, delivering significant benefits for patients, better and more efficient healthcare services, and supporting jobs growth and wealth in Wales. However, the healthcare system is large and quite slow to change, so it will take time for this to happen.

55 Centres of excellence are models of what we would like the whole healthcare system to be. Focussed on a single area, they link clinical services to research, teaching and knowledge transfer. They deliver better services by focussing clinical expertise, engage confidently with academia and industry, generate new knowledge and ideas, and translate this into learning, products and services. Our prototype for this is the Welsh Wound Innovation
Centre, which will provide specialist wound healing services, manage research trials, design and deliver training courses, manage a wound healing register, and work with industry to attract inward investment to Wales and to increase collaborative R&D in Wales.

We believe that there are other potential centres of excellence in areas such as minimally invasive surgery, reconstructive maxillofacial surgery, neurosurgery, orthopaedics, and telehealth. Our advice is to identify and fund centres through a competitive process, similar to that used in Scotland for Health Innovation Centres, and in England for Healthcare Technology Co-operatives and Academic Health Science Networks.

Create an ownership vehicle to own healthcare innovation subsidiaries

We believe that arms length subsidiaries are critical to creating ‘space for innovation’. They must have the freedom to respond at pace, to collaborate with external partners, and in some cases to generate revenues. Healthcare innovation is itself a competitive market, and it is important that Welsh bodies can match the flexibility and responsiveness of arms-length organisations throughout the UK and internationally.

This approach requires legal, governance and commercial expertise, which may not exist in all healthcare organisations. From a policy perspective, it needs oversight of the range of subsidiaries, robust performance management and governance, and a clear view of how they balance public and commercial interests. This does not in our view mandate public sector control ownership or control, and there are potential advantages to an independent organisation, particularly from a public sector budget perspective. We note with interest that in England NHS Innovation Hubs and AHSNs are established as independent companies, limited by guarantee. There should however be a very clear view of the Welsh public interest, with a strong sense of shared mission and vision which includes healthcare organisations, universities and the Welsh Government. Representation from industry and outside Wales would help to ensure challenge and relevance.

Our advice is that as a starting point such a vehicle could be inspired by the Finance Wales plc approach to equity and loan finance in Wales, with further consideration given to more widely shared ownership and control. Alternatively, since we see healthcare innovation as offering such significant and lasting value to the people of Wales, we are also intrigued by the Glas Cymru model of ownership by trust, which is distinctive to Wales. This was established in 2001 with a clear intent to act in the long-term public interest, and has delivered major infrastructure investment at a lower cost of capital than its peers, which in turn has delivered market leading customer value and satisfaction.
We have developed a model of a Welsh healthcare innovation system to structure our understanding of how existing initiatives and the wider healthcare system fit together. This is not claimed to be a perfect or an ideal representation, but it is we think a useful tool which can be used to focus on roles, functions and purpose.

At this stage, we see this as a conceptual model, and so we have not sought to describe the particular structure and scale of various elements, which should vary to reflect existing capacity, policy priorities, and the availability of additional resources from partners and funders.

Although we describe this as a healthcare innovation system, it has a broader overall purpose, which is to link improved health and more efficient healthcare services to wealth creation in Wales. In this regard it is comparable to the recently established Academic Health Science Networks in England.
Building on our recommendations, the model describes: innovation assets which act as a foundation for creating value; innovation gateways whose main purpose is to realise that potential value; and centres of excellence which bring expert clinical, research, teaching and knowledge transfer activities together.

Each asset is linked to a gateway on a thematic basis, covering research, technology adoption, population data, digital health, and knowledge management. These are intended to be very loose themes, and all of the assets and gateways should interact. For example: the technology adoption gateway would draw on research, knowledge and digital assets as well as on data, and would work closely with the research gateway on designing studies, with the digital gateway on access to digital systems, or the innovation gateway on shared IP.

In many cases, these assets and gateways already exist. Our approach is not to replace or to restructure existing initiatives, but only to bring more clarity and simplicity to what is currently a very complex system. We want to make access to assets and other resources much simpler by creating clear entry points into the Welsh healthcare system. Acronyms and dense organograms should be concealed from view and interpreted for external partners, at least on initial contact.

**Innovation Assets**

Innovation Assets are long term investments which create lasting value. They should build on existing resources or on the distinctive characteristics of the Welsh healthcare system. They should aim for whole population or whole system scale, and for international reputation and credibility, over a medium to long timeframe. Their structure and management should consider how they can provide real lasting value to healthcare, academic and industry partners, and how they can attract external funding and investment to sustain and to accelerate development.

These innovation assets are:

a. A **research base** which structures specialist academic knowledge and research expertise and has links to global research partners, building on existing programmes like NISCHR’s research infrastructure, funding schemes, and Science for Wales. This asset’s priority would be to increase research knowledge and talent and to strengthen research facilities, teams and networks in Wales.
b. Large databases of population data at a national scale, linking e-health data to genomic information, building on the e-health expertise and information in the SAIL database and the Farr Institute at Swansea University. This asset's priority would be to improve the coverage and quality of e-health data, by linking many sources of data together and making this information easier to access and to use.

c. Comprehensive and granular service and performance data covering the whole Welsh healthcare system, including cost information as well as quality and performance measures, linked to population data. This asset's priority would be to improve the consistency, quality and timeliness of service and performance data, through routine collection and linkage of accurate and comprehensive data, which is easy to access and to use in real time.

d. **Digital systems** which have a robust, modular, scalable and accessible architecture, building on the Informing Healthcare strategy and work by NHS Wales Informatics Services. This asset's priority would be to make systems and information more accessible to external partners, by improving their interoperability, ensuring compliance with open or published standards, and providing reliable infrastructure and ubiquitous connectivity.

e. The knowledge base of healthcare professionals who understand the needs of the healthcare system, are enthusiastic for innovation, and have the skills to translate knowledge into outcomes, building on learning and development programmes and improvement methodologies. This asset's priority would be to make innovation, collaboration and industry engagement a more prominent feature of organisational cultures in Welsh healthcare, at every level. There is already a significant annual investment in workforce development and training. Our view is that existing programmes could be flexed to better promote enterprise and innovation so that this is 'mainstreamed' into professional practice at all levels.

**Innovation Gateways**

68 Innovation Gateways drive the realisation of value from individual assets and from the system as a whole. They act as entry points to healthcare innovation in Wales, as promoters of assets and opportunities, as brokers to actively bring partners together, and as sources of expert knowledge. Each Gateway should have a single clear purpose, with robust accountability and performance management, but we
see significant value from co-locating people from each of the Gateways in one place. Our advice is that this should be in the Life Sciences Hub premises in Cardiff Bay, already planned as a single location which will connect the life sciences sector within Wales and attract external partners to invest into Wales. Our advice is that Gateways would benefit from the freedom to collaborate at pace with external partners (including industry), and that this would probably be best achieved through a corporate legal structure.

69 These Innovation Gateways are:

a. **Healthcare Research Wales** – access to the research base in Wales, building on the existing capacity of the Health Research Wales service and NISCHR AHSC. This gateway’s priority would be to increase research funding and activity in Wales, including through collaboration, and to increase the profile and reputation of Welsh research within the UK and beyond.

b. **Healthcare Data Wales** – access to population data assets, building on the existing capacity of services like e-health at Swansea University. This gateway’s priority would be to increase the use of population data assets for research and as evidence for innovation and service improvement, and to attract businesses to locate and invest in Wales using the quality of Welsh expertise and data.

c. **Healthcare Technology Wales** – access to technology appraisal, adoption and evaluation, building on the existing capacity of services like CEDAR, SMTL, NHS Shared Services Procurement, and on the Board’s Technology Adoption Systems Guidance. This gateway’s priority would be support for ‘innovation in’ to the healthcare system, bringing more speed, direction, control and intelligence to technology adoption, and using this to attract businesses to locate and invest in Wales.

d. **Digital Healthcare Wales** – access to digital healthcare systems in Wales, promoting access and ensuring interoperability and standards-compliant software and devices. This gateway’s priority would be to create an ecosystem for digital healthcare development in Wales, by supporting software developers and medical technology designers in Wales, certifying products as meeting interoperability standards, promoting access to healthcare systems for testing and development, and using this to attract businesses to locate and invest in Wales.

e. **Healthcare Innovation Wales** – access to people and knowledge within the NHS. This gateway’s priority would be support for ‘innovation out’ of the healthcare system. It would identify and realise value through a structured IP management service, accelerating the development of selected ideas and projects out of the NHS.
and social care, and generating more outcome focussed R&D collaborations, particularly in medical technology and diagnostics. This Gateway would also act as an observatory of engagement with industry across the healthcare system, ensuring a more consistent approach and strong management of public interests.

**Centres of Excellence**

70 Centres of Excellence bring together clinical services, research, teaching and knowledge transfer activities within a particular clinical or service area where there is excellence or opportunity. By bringing these activities together they seek to create new knowledge and to apply it to clinical practice. Centres have a strong focus on supporting the creation of jobs growth and wealth. They seek to protect and to use new intellectual property to create commercial value, and they promote partnership with industry, seeking to attract businesses to locate, invest and cluster in Wales.

71 We see Centres of Excellence as micro University Health Boards. Because of their focus on a single area of clinical practice or service delivery, they will develop real expertise, firstly through recruitment and retention of people, and secondly through a cycle of positive feedback from research, practice and learning activity. Because of their small scale they will be able to respond quickly to new challenges, technology and knowledge, and also to innovate at pace. Our advice is that a small number of centres could act as exemplars of how an innovation approach can deliver significant shared value, increasing health and wealth in Wales. They should also act as beacons, demonstrating to ‘real’ University Health Boards how they can create value from linking service delivery to research and teaching, and modelling a more responsive and innovative organisational culture.

72 Our prototype concept for Centres of Excellence is the Welsh Wound Innovation Centre, which will provide specialist wound healing services, manage research trials, design and deliver training courses, manage a wound healing register, and work with industry to attract inward investment to Wales and to increase collaborative R&D in Wales. We believe that there are other potential centres of excellence in areas such as minimally invasive surgery, reconstructive maxillofacial surgery, neurosurgery, orthopaedics, and telehealth.

73 We think that Centres should quite quickly become self-financing, generating revenue from contract and funded research, from developing and delivering training courses, from knowledge transfer, and from other commercial activities. Our advice is that Centres need a clear identity and the freedom to collaborate directly with external partners, and we expect that this would be best achieved through a corporate legal structure. We think that any operating surplus should be re-invested by Centres to further develop their own activity,
although where there is a very significant surplus that could be delivered back into the Welsh healthcare system.
Appendix 1

NHS Social Care & Business Workstream Scope

The work undertaken by the NHS, Social Care and Business Workstream will be based upon a requirement to add value and promote sustainable systemic change.

The key areas of work identified will be progressed through a multi agency and multi sectoral approach. It will not focus upon any one sector, but will instead seek to ensure that the strands of work progressed under the workstream deliver impact and sustainable improvement for both NHS Wales and local government.

The actions progressed will be delivered within the context of, and contribute to, the wider economic agenda – seeking to identify and maximise the public sector contribution towards economic growth and stability.

Recommendations on best practice will be based upon evidence and engagement.

In identifying and progressing the work programme the Workstream Group will ensure it does not cut across or duplicate work already underway via other means, including other workstreams. It will seek to ensure that there is a proper interface between the workstream deliverables and actions underway via other routes.

The purpose is therefore to provide advice and guidance to the Minister on opportunities relevant to health, social care and business, in the following areas:

- Enabling and supporting translational research and technology transfer out of the NHS;
- Enabling and supporting procurement to deliver innovative solutions in response to needs and challenges, including more consistent adoption and diffusion of products, services and practice throughout the healthcare system;
- Developing connected health in Wales, including eHealth, mHealth, big data, and the development of an ecosystem which enables and supports innovation and engagement with industry;
- Making the NHS and social care in Wales more accessible to industry and more open to collaboration and partnerships focussed on research and innovation;
- Exploring new models of delivery in health and social care, particularly mutual, collaborative and social enterprise approaches.
NHS Social Care & Business Workstream Membership

Joint chairs

- Ifan Evans, Deputy Director, Healthcare Innovation, DHSS, Welsh Government
- Chris Martin, Chair Hywel Dda Health Board

Members

- Philip Allen, Head of Knowledge Transfer & Commercialisation, EST, Welsh Government
- Dr Peter Bradley, Director of Public Health Development, Public Health Wales
- Andrew Davidson, Chief Executive, DTR Medical
- Prof Andrew Davies, Chair ABMU Health Board
- Alun Lloyd, Finance Programme Lead, DHSS, Welsh Government
- Bev Luchmun, Commercial Trials NHS Innovation and IP, NISCHR
- Paul Matthews, Chief Executive, Monmouthshire County Council
- Ciaran McMahon, Director, Biomet UK
- Mark Roscrow, Director of Procurement Services, NHS Wales Shared Services Partnership
**Selected Literature**

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Welsh Government, Innovation Wales (2013)


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Topol, The Creative Destruction of Medicine: how the digital revolution will create better health care (2012)