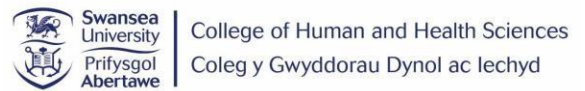


JANUARY 1, 2021

PARTNER EVIDENCE



University of
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Project title: Development of an Advanced Digital and Physical Engineering (ADPE) Hub

Univ Dept: School of Medicine, School of Engineering

UHB Dept Innovation Hub

Key contacts: Barbara Cole, Sue Bevan & Michael Packianather, School of Engineering, Cardiff University Dr Tom Powell (CTM UHB - RIIC Hub) Tom.Powell2@wales.nhs.uk Jason Ingham (CTM UHB - Oral and Maxillofacial Surgery) Jason.Ingham@wales.nhs.uk

1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

The COVID-19 crisis has been instrumental in highlighting the need to be able react to the changing demands/issues within the Welsh Health Boards and Trusts, two major issues that came to light within Cwm Taf Morgannwg University Health Board (CTM UHB) involved equipment deemed out of order due to lack of parts from suppliers, and to be able to prototype innovative ideas. In the first few months of Covid-19 the Senior chief technologist and dental laboratory manager Jason Ingham and his team looked at creative ideas of how they could repurpose the existing Maxillofacial-Dental laboratory and equipment at the Prince Charles Hospital to produce a number of 3D printed items. The team initially produced visors and other non- clinical items such as door handles that allowed for hand free opening.

The idea is to address the immediate and long term needs of the HB and to build on initial innovative work and establish an Advanced Digital and Physical Engineering (ADPE) Hub at Prince Charles Hospital that will accelerate the impact of game changing innovative ideas. This hub will bring together, and provide a platform for, staff, patients, academics and industry partners to engage in an innovative way of working to provide an autonomous and rapid mechanism to respond and enable practical solutions to issues.

Working with academic and industrial partners we intend to explore potential pathways for waste into new products, creating a circular economy by changing unrecyclable plastic packaging, avoiding landfill and reducing both the cost and carbon footprint to the HB.

This project aims to provide an opportunity for staff to influence innovation within the Welsh NHS as a whole, we hope to encourage sharing of best practice and ideas, and we hope to encourage other Health Boards and Trusts to consider their carbon footprint, while demonstrating the importance innovation. This will be supported with education, training, measurement and academic evaluation.

2. During What stage is the project currently at and what work has been completed to date?

A great deal of effort has gone into identifying a company that would be willing to work with/in CTM UHB on this project, we identified a Welsh Company who have created a 'Spin out' company. The collaborative project is drawing each partner to;

- Cardiff University will provide clinical academic and academic input to advise and provide specialist expertise. In addition, health economic cost analysis to evaluate the cost, time and resource savings as a result of the service will be provided by the Accelerate team.
- The School of Engineering input will provide the ability to undertake additional production, trialing and validation of new products, where identified providing increased capability and resilience. This academic involvement is a key metric of this project, so as to ensure academic rigor of the project
- CTMUHB are keen to expand the Hub capability and expertise, however key to any future success will be the close collaboration with both local industry and academic partners to create a sustainable environment for this to occur

- Industry capability on board as partners, within a designated working space will enable health boards to rapidly prototype and test ideas, eliminating risk, reducing experimental stages and utilising industry partner know how to scale up production of best solutions.
- Shared knowledge and academic know how, expertise and skill will establish a platform to provide innovative solutions to issues presented
- Academic involvement to ensure best practice
- Collection and Evaluation of data collected
- Help identify possible commercial opportunities so that CTMUHB can realise income opportunities to help create a sustainable ability.

To date the collaboration has provided the following:

Clinical and Service Delivery Support

- Door handles, visors, valves, equipment covers etc.
- Max Fac surgical engagements around jaw reconstruction
- Started engagement with primary care clusters
- CTM Investment in lab fit out and oral scanner

Commercial Activity

- Set up an online portal for staff suggestions
- Cable Management Clip (already have orders)
- Prep plate

This project is 10 months into delivery and has seen the establishment of a dedicated 3D scanning/printing laboratory at the Prince Charles Hospital with satellite hubs at the Royal Glamorgan, Princess of Wales and Bridgend Field hospitals. These shared facilities for CTMUHB will enable shared expertise, resources and knowledge to address issues and capitalise on innovative ideas brought to the table. Research and innovative collaboration bringing together industry partners, academic knowledge and expertise and informed by clinical knowledge and expertise has proved successful from the outset with a number of innovative solutions to issues already produced and the commercialisation of these being explored. This project has enabled previously shelved equipment to be repaired with replacement parts made, fitted and inspected for safety before being commissioned back into use. The parts to repair this equipment unavailable to source or where available with long lead times.

We have linked this project with the Operating Theatre project on plastic recycling so that we can take advantage of the waste stream of sterile plastics in order to extract the maximum value from the waste, we hope to recycle it into 3D filament, for use in developing 3D prototypes. Veolia are keen to support this innovative work and have already suggested that they would be happy to collect the waste and deliver to Innotech in order for them to process it.

What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? (How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)

Metrics for this project will be innovative products that are adopted into the HB and the NHS. The establishment of a spin out company for the commercialisation of products would generate revenue to further expand this facility and enable sustainability as well as reducing costs and equipment downtime. The innovation team is leading on the development of possible social enterprises wholly owned by CTMUHB to host this type of activity.

Staff will be empowered with their innovative ideas being adopted and implemented to resolve issues, increase productivity, increase staff and patient safety, etc.

What are the anticipated impacts and outcomes of the project? *(What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)*

The impacts and outcomes from this project will be wide ranging, some of these are captured below;

Staff Behaviour :

- Combine education & measurement (survey / training)
- Increase engagement of NHS staff to identify innovative ideas.
- Increase engagement of NHS staff in identifying possible 3D design objects
- Improved Staff Confidence and Involvement in Innovation activity

Economic/Environmental Value

- Circular Economy : Identify waste that can be recycled in keeping with the ideas around reducing the carbon footprint of the HB, while extracting the maximum value for waste
- Look at the economic value of recycling of plastic waste
- Look at the environmental impact from recycling of waste, consider upscaling
- Possible new products to market
- Delivery of specialised, new/prototype equipment and devices, long lead time parts and innovative solutions.
- Poly jet printer will enable decreased print time and minimal post process time.
- Reduced clinical time as specific parts can be on hand quicker.
- Primarily in terms of greater efficiency in both clinical time and manufacturing capability
- Reduced need for storage as common designs can be printed on demand.

Industry

- Increased collaboration with Industry partners
- Identify possible research opportunities of working in collaboration with Industry
- Identify opportunities for further projects
- Identify possible student placement opportunities
- Identify possible KESS/KTP opportunities

Other outcomes

- Leverage the access to this approach to help with recruitment of clinical staff
- Improved Patient Care
- Greater resilience - deliver improved capacity and ability to produce equipment and parts to support timely patient care.
- Cost and time savings
- The proposed ADPE hub will act as a central point for collaboration between clinicians, industry and academia.

3. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

There is clear policy impetus in Wales from the Future Generations Act for sustainable approaches in terms of how health and care services are delivered. The way in which we procure consumable items and working with key suppliers could be key to achieving our Future Generations Act obligations and help aid the recycling of waste material.

This project is a key example of collaborative RD&I bringing together a Welsh industry, HB and HEI to enable a better working ethos to support the ideas of staff, reduce costs, waste, time and resources.

Overall there is increased resource and resilience within the HB with a decrease in resources bought in.

4. Is there funding for this project? *(Welsh Government, third-sector funding, Research).*

There is limited funding available through the WEFO/ERDF Accelerate project, however Cardiff University and the CTMHB is providing match funding as part of the project, as is the Industry Partner

5. **What data do you have to demonstrate the impact(s) of this project?** *(Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)*

The repurposing of part of the dental laboratory by Jason Ingham and Stacey Evans has shown in a relatively short space of time what can be achieved and the impact that it can have. We have examples of;

- improved patient care
- improved staff confidence and involvement in innovative activities
- increased skill and opportunities
- improved collaboration between industry, HB and HEI
- cost saving
- time saving
- increased resilience

6. **What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ?** *(Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)*

This project runs for the duration of the Accelerate programme. We are continuing to work with CTM UHB to identify other possible projects and look at how these can be linked to the University in order to be of benefit to all partners.

This type of activity is a key indicator of the Academic partnership we have with Cardiff University and will be incorporated in the upcoming review of University Health Board status.

Project title: Abercynon Social Prescribing Project

Univ Dept: School of Medicine & Engineering

UHB Dept: Innovation Hub & Astute

Key contacts: Barbara Coles & Andrew Cuthbert

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1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

Social prescribing, sometimes referred to as community referral, is a means of enabling GPs, nurses and other primary care professionals to refer people to a range of local, non-clinical services. Recognising that people's health is determined primarily by a range of social, economic and environmental factors and seeks to address people's needs in a holistic way. It also aims to support individuals to take greater control of their own health. It is designed to support people with a wide range of social, emotional or practical needs, and many schemes are focussed on improving mental health and physical well-being. Those who could benefit from social prescribing schemes include people with mild or long-term mental health problems, vulnerable groups, people who are socially isolated, and those who frequently attend either primary or secondary healthcare (<https://www.kingsfund.org.uk/publications/social-prescribing>). Social prescribing schemes can involve a variety of activities including volunteering, arts activities, group learning, gardening, befriending, cookery, healthy eating advice and a range of sports. There are many different models but most involve a link worker or navigator who works with people to access local sources of support.

There is emerging evidence that social prescribing can lead to a range of positive health and well-being outcomes. Studies have pointed to improvements in areas such as quality of life and emotional wellbeing, mental and general wellbeing, and levels of depression and anxiety, which may lead to a reduction in the use of NHS services. However, robust and systematic evidence on the effectiveness of social prescribing is very limited. Many studies are small scale, do not have a control group, focus on progress rather than outcomes, or relate to individual interventions rather than the social prescribing model. Much of the evidence available is qualitative, and relies on self-reported outcomes. Determining the cost effectiveness of social prescribing is particularly difficult. Several studies highlight the importance of measuring the wider social value generated through social prescribing, for example through reducing welfare benefit claims. Again, this can be difficult to measure, and may require a longer- term approach.

Green prescribing is a subset of social prescribing

The positive health effects associated with green prescribing were originally thought to be due to increased exercise in the fresh air as means of addressing obesity and combating cardiovascular disease. Activities prescribed included walking and cycling, as well as working on conservation projects and gardening. More recently it has been recognised that the act of spending time in natural or semi-natural environments (e.g., forests, grasslands, gardens and parks) can result in significant positive mental health benefits (McEwan et al., 2019; Saris et al., 2019; White et al., 2019). Gardening can provide relief from acute stress and improve symptoms of depression (Clatworthy et al 2013; Soga et al., 2017) and simply spending time in nature enhances the ability to recover from stress and can facilitate healthy child development (Largo-Wright et al., 2018; Pasanen et al., 2018; Wyles et al., 2019). Natural environments can also provide important places for reflection and introspection and for facilitating group-based convivial activities, which could help to improve social cohesion and enhance mental health (Fuller et al., 2007; Bethelmy and Corraliza 2019; Barrable 2019; Jennings and Bamkole 2019). Interventions which increase or improve green space can deliver positive health, social and environmental outcomes for all population groups, particularly among lower socioeconomic status individuals. They are most effective when physical improvements are coupled with a social engagement/participation element that promotes the green space and reaches out to new target groups. These improvements need to be

planned and designed with the local community and the intended green space users to maximise the benefits to local residents (WHO 2017).

As with all forms of social prescribing there is considerable interest in capturing the impact of green prescribing activities at the individual and societal level. In their 2017 report entitled *“The Health and Wellbeing Impacts of Volunteering with The Wildlife Trusts”*, Rogerson and colleagues reported that the mental wellbeing of more than two-thirds (69%) of all participants engaging in nature based activities had improved after six weeks of activity (Rogerson et al., 2017). They also recorded significantly enhanced feelings of positivity, increased general health and higher levels of physical activity. A subsequent 2019 study based on this work calculated a Social Return on Investment of £8.50 for every £1 invested in Wildlife Trusts volunteering programmes designed to improve mental, physical and social wellbeing (Bagnall et al,2019). These findings support the idea that carefully designed, nature based approaches have the potential to deliver improved health and wellbeing at a population scale, reducing the current burden on the National Health Service.

2. What stage is the project currently at and what work has been completed to date?

What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? *(How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)*

The project is in the later stages of scoping and development. The project is due to start at the latest 1st April 2021 and run for 12 months in total.

In this project we propose to build on the links which already exist between local GP surgeries, wellbeing coordinators and CYOA to create a new opportunity to engage with a nature based activity. The first task will be to undertake a comprehensive review of the green prescribing literature with regards to its value to individuals and to society. Once complete this report will be made available to healthcare professionals who are unfamiliar with the concept of green prescribing.

In parallel we will survey local GPs and wellbeing coordinators to gauge their awareness and views on the value of green prescribing and the possible benefits it provides for i) patients; ii) local communities; and iii) health services. The information captured from these two data gathering activities will inform the creation of a nature trail by the local community, healthcare professionals, the university and patients which is aligned to the New Zealand nature-based five ways to wellbeing. Finally we will develop a wellbeing app based tool to assess the impact of engaging with the nature trail on the subjective wellbeing of all individuals (both patients and community members). Once developed the this trail and its associated wellbeing activities will serve as a model for others seeking to develop nature based, health promoting activities across Wales.

The following factors need to be addressed when developing a community based green prescribing activity and form the metrics for the project evaluation:

- The need to increase the awareness of healthcare professionals of the potential benefits of prescribing nature based activities
- Activities need to be planned and designed in partnership with the local community and the intended green space users
- Activities should aim to combine physical activity with a social engagement/participation element and should reach out to new target groups
- Include a mechanism to generate robust and systematic evidence on the impact of the activity on clients and the community.

What are the anticipated impacts and outcomes of the project? *(What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)*

Outcomes

- 1) A co-produced nature trail in Abercynon designed in partnership with the local community which promotes wellbeing
- 2) An app based wellbeing tool which can be used to measure the subjective wellbeing of individuals engaging with the trail
- 3) A model green prescribing approach which could be replicated at other sites across Wales
- 4) A review of the current state of the art with regards green prescribing- Produced by the university
- 5) A report collating feedback from GPs, wellbeing coordinators and patients in Abercynon on their perception of green prescribing and the benefits it provides. The report will identify any barriers to the widespread adoption of green prescribing- Generated by the university in consultation with local healthcare professionals
- 6) A co-produced nature trail in Abercynon which provides opportunities to engage with nature and promote wellbeing- designed to benefit the local community
- 7) Validation of a subjective well being app to measure the impact on individuals of engaging with the trail- designed to benefit the local community and to validate a resources that can be adopt to support other nature based projects.
- 8) A model of how to co-develop nature based activities which could be replicated at other sites across Wales

Impacts

- 9) Increased awareness of the potential benefits of green prescribing for the local population amongst healthcare professional in South Cynon
- 10) Evidence to show that engagement with nature through the medium of a nature trial has a positive impact on community wellbeing

3. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

Working with the community we will develop a nature trail in Abercynon which will provide opportunities for GP referrals and community members to engage in nature-based activities to enhance their personal wellbeing. The impact of green prescribing on personal wellbeing will be assessed using an on-line self-assessment tool developed as part of this project. The expectation is that this, focused, local project will provide data of value to communities across Wales who are interested in developing their own nature-based projects.

This project links directly with A Healthier Wales and the Wellbeing of Future Generations Act on many aspects;

- A health and social care system that works together
- Shifting of services out of hospital into the community
- Establishing increased measures of what really matters
- Making Wales a great place to work in health and social care
- “community-based” approaches
- Supporting people to stay well, not just treating people when they become ill
- Value of physical and mental health and the promoting of health behavioural changes
- Promotion of the Welsh culture and heritage to encourage participation in arts, sports and recreation

4. Is there funding for this project? (Welsh Government, third-sector funding, Research).

There is limited funding available through the WEFO/ERDF Accelerate project, however Cardiff University and the CTMHB is providing match funding as part of the project, as is the Industry Partner

5. What data do you have to demonstrate the impact(s) of this project? *(Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)*

Barriers to engagement with green prescribing

Green prescriptions are typically administered to patients with a defined need and are used to complement orthodox medical practices (Van de Berg, 2017). Nature-based intervention activities can include therapeutic horticulture, biodiversity conservation activities, care farming (i.e., farming practices for health, socialising and education), nature walks, and social activities in greenspaces (Else, Murray and Bragg 2016; Hart 2016). In the UK, little is known about the status, socioecological constraints and opportunities associated with green prescribing. A recent study by Robinson and colleagues surveyed the options of general practitioners (GPs) and nature-based organisations (NBOs) primarily in England, on the factors which prevented the wide spread adoption of green prescribing (Robinson et al., 2020). For GPs the commonest barriers to engagement were; access to organisations providing native-based activities (28.9%), funding (27.2%) and awareness of the green prescribing concept (25.4%).

Indeed, many doctors are not aware of green prescribing, nor do they have a firm understanding of the benefits or know how to get involved (Jorgensen 2020). The prescribing process needs to be made easy, for doctors, social care professionals and patients. GPs often lack time and resources, while patients may lack motivation and confidence, or have little previous positive experiences of nature. Finally, we need new ways of working with local organisations and communities to understand what is needed in local contexts so that we can develop local skills and capacity. Interestingly, a key constraint expressed by NBOs in the Robinson study was the inability to engage with GPs and other primary care professionals. This finding highlights the importance of adopting a co-production approach is the development of future green prescribing activities.

The success of this project will be measured by capturing the views of local GPs, the cluster wellbeing coordinator and service users on green prescribing using a combination of surveys and structured interviews. Our aim is to determine their awareness of, and views on the value of green prescribing and the possible benefits it offers to, i) patients; ii) local communities; and iii) health services.

Additionally, the university will work with local schools and nature groups to develop educational resources and nature monitoring activities linked to biodiversity and climate change. As part of this effort will create a digital trail similar to the example which can be accessed via the following link <http://www.jubileecountrypark.btck.co.uk/Thingstodo/DigitalNatureTrail>. we will determine the impact of participating in the creation of the nature trial on subjective wellbeing. We will determine the subjective wellbeing of all individuals (both patients and community members) involved in the design and construction of the trail using a tool developed by the university to assess interaction with green spaces.

6. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? *(Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)*

We continue to work with CTM UHB to identify possible projects and look at how these can be linked to the University in order to be of benefit to all partners.

This type of activity is a key indicator of the Academic partnership we have with Cardiff University and will be incorporated in the upcoming review of University Health Board status.

Project title: Developing Antimicrobial and Viricidal Surfaces

Univ Dept: School of Medicine and School of Pharmacy

UHB Dept: Innovation Hub

Key contacts: Barbara Coles and Sue Bevan Tom Powell (CTM UHB - RIIC Hub)

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1. What are / were the background of the project and what key aims and objectives have been identified?

- *(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)*

The COVID-19 pandemic has seen an urgent need to be able to sanitise and sterilise surfaces and areas in both clinical and non-clinical settings. Cwm Taf Morgannwg University Health Board (CTMUHB) UHB and The Royal Mint (TRM) developed a strong relationship during the design and production of visors to address the PPE shortage at the outset of the COVID-19 pandemic. As a result of this discussions started around the copper plating of surfaces as an enhanced antimicrobial measure. Scientific and academic experience and knowledge was sought through the Accelerate Team at Cardiff University to bring together all expertise to support and manage this innovative research initiative.

Studies into the anti-bacterial properties of metallic elements such as copper are well known with a wide range of published research studies in different environments. TRM has the biggest copper plating facilities in Europe and are keen to explore the potential of repurposing of this in partnership with the NHS.

As a healthboard CTMUHB has three district General Hospitals and 4 community hospitals as well as numerous other sites where there is the potential to deploy. There is also interest with Local Authority Staff interest to explore the potential deployment in schools, care home and GP practices. The immediate situation requires the Ysbyty Seren Field Hospital in Bridgend to be a COVID free step-down facility. It is here clinical access is planned to trial, evaluate and test the various surfaces and coverings.

TRM are initially looking at copper plating finger plates on doors, trolley tables and other flat surfaces such as door plates, bin lids, etc. TRM will contribute further with a bank of tests to develop the end product;

- Wear testing
- Tarnish testing
- Adhesion testing
- Chemical resistance testing – cleaning chemicals
- Corrosion testing – particularly if steel substrate³

Cardiff University will establish and investigate the efficacy of various coatings (copper, brass and an anti-tarnish copper) for anti-microbial and anti-viricidal properties in the facilities at the School of Pharmacy and the BSL3 Infection and Immunity laboratories at the Heath hospital. Tests will determine the effectiveness of the various plating under different conditions (amounts of virus, contact times), the method will be able to quantitate the amount of virus remaining that is able to establish productive infection in permissive cells.

2. During What stage is the project currently at and what work has been completed to date?

The urgency of this innovation to address COVID-19 has seen a rapid, collaborative project response to enable shared expertise, resources and knowledge to validate the proposal. The project team has been established (consisting of enterprise lead, RD&I CMTUHB lead, Medical Lead, Virology lead and Microbiology lead) and work packages identified. TRM have produced and CMTUHB plan to install a number of items in the Ystbyty Seren Field hospital.

Appropriate methodology and validation of anti-microbial and anti-viricidal tests have been established with test samples in preparation for delivery to the CU laboratories. Accelerate will provide support for this collaborative research project by providing expertise from CU academic staff, technical staff and consumables. Given that this project will involve working with high titres of virus, CU is uniquely placed as it has staff trained in virology and the Category 3 facilities required to convert this project.

The next steps will be to;

- Clinical trials and testing of TRM's proprietary copper plating on critical NHS touch points in situ. Daily swab testing on treated and untreated touch points, and the microbial analysis of those swabs.
- Full laboratory bacterial and viral testing on test swatches plated in the new copper based treatment. To determine how long key bugs (Covid, MRSA, Norovirus, Staphylococcus aureus, Acinetobacter baumannii and MS2 bacetriophage, etc) remain active on the surface, in comparison to on a standard stainless steel or plastic surface.
- Validation of both of the trials above, providing the proprietary copper plating with NHS validation and certification
- Understanding of the NHS priorities in terms of touch points beyond finger plates that should be prioritised.
- Access to the NHS market, in terms of a potential retrofit plan for key touch points.
- Working with NHS to develop a new touchpoint specification for future tenders of key touchpoint items to be acquired.

What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? (How are you measuring your outputs /outcomes, and measuring against the meeting the objectives?)

This research collaboration will produce high quality quantitative performance data on the effectiveness of various coatings to demonstrate bactericidal and viricidal activity against coronavirus, particularly 2 Sars-CoV-2.by an independent research team. The key outputs will be the data package and the analysis and publications in reputable research journals and from this, wide dissemination of the performance characteristics of the products for industry and public awareness.

What are the anticipated impacts and outcomes of the project? (What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)

TRM will have a new and approved proprietary product, which it can enter into both the public and private market place.

The NHS will have access to a new anti-microbial technology, which TRM will actively work with the NHS to ensure is developed for other key touch points in healthcare facilities.

The new product range for TRM will secure and add jobs in the Llantrisant area. It will also act to further cement to relationship between TRM and Welsh NHS, enabling and leading to future collaborative projects.

The Welsh NHS will reduce (Healthcare associated infection) HAI's and reduce the likelihood of COVID-19 entering the hospital. An American study showed that with HAIs, patients stayed an average of 24 days in hospital, compared with 5 days without HAIs. This reduction of 19 days represents a huge cost saving for the NHS and better patient outcomes

All partners are interested in working to generate a data package and publication on the efficacy of copper plating against bacteria and in particular the SARS-CoV-2virus, which will then be published and disseminated widely for public information. Once the experiment and the data analysis is completed, the results will be submitted for publication to disseminate the findings more widely subject to a review of confidential information. The results may also contribute to scientific posters and presentations at conferences. The aim will be to effectively communicate the information to the public.

This will be valuable information for protecting public health, both during and after the global coronavirus pandemic.

This may enhance TRM reputation with respect to their work protecting public health and the reputation of the University will also be enhanced by publication in a respected journal. Proving efficacy against SARS-CoV-2 may open a bigger market up for the TRM, potentially leading to resilience and growth at a difficult time for industry in the UK.

The anticipated outcomes for Cardiff University with microbiology and virology expertise is development of knowledge and practical know how of mechanisms and bio-medical applications of copper coating as bactericidal and viricidal agents in the working and domestic environments. The outcomes and impact of this collaboration will have significant benefit to Cardiff University, these include:

- Increased collaboration between Cardiff University, CTMUHB and TRM, result in a platform of further Research and Development projects between the partners.
- This R,D&I platform provides significant opportunities for Increased grant income potential and research staff employment
- New data to support development of further health interventions.
- Potential for peer-reviewed publications
- Increased support for the University's Civic Mission agenda
- Industrial collaboration directly supporting the University's performance in REF 2021

3. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

This project will, if proved successful, will lead to a healthier Wales with increased resilience and prosperity given the prospect of increased health for patients, staff and increases in industry growth and employment.

This project is a key example of collaborative RD&I bringing together a Welsh industry, HB and HEI to enable people, staff and patients to stay well by reducing infection, reduce hospital stay and treatment costs.

4. Is there funding for this project? (Welsh Government, third-sector funding, Research).

There is limited funding available through the WEFO/ERDF Accelerate project, however Cardiff University and the CTMHB is providing match funding as part of the project, as is the

Industry Partner

What data do you have to demonstrate the impact(s) of this project? (*Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety*)

Research work will produce quantitative data that will demonstrate increased patient, staff and general public safety by reducing infection risk and infection spread. All partners are interested in working to generate a data package and publication on the efficacy of copper plating against bacteria and in particular the SARS-CoV-2virus, which will then be published and disseminated widely for public information. Once the experiment and the data analysis is completed, the results will be submitted for publication to disseminate the findings more widely subject to a review of confidential information. The results may also contribute to scientific posters and presentations at conferences. The aim will be to effectively communicate the information to the public.

What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? (*Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?*)

This project is planned for 6 months at the outset, there is scope to expand should the clinical access planned to trial, evaluate and test the various surfaces be delay due to COVID-19, staff shortages, cessation of research at Cardiff University (due to COVID-19), etc.

This type of activity is a key indicator of the Academic partnership we have with Cardiff University and will be incorporated in the upcoming review of University Health Board status.

Project title:

Exploring the needs of service users with co-existing mental health and neurodevelopmental disorders accessing mental health services in CTMHUB

Univ Dept:

School of Healthcare Sciences: Occupational Therapy, Cardiff University and Faculty of Life Sciences and Education, University of South Wales

UHB Dept

Adult Mental Health, Kier Hardie Health Park

Key contacts:

Chelsea Courts (PhD student), Dr Catherine Purcell (Cardiff University), Dr Anne Fothergill, (USW), Professor Ruth Northway (USW), Emma Francis, Occupational Therapist (CTMUHB)

1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

This study has two aims: (1) to explore the needs of service users with co-existing ASD and mental ill health to establish whether these needs are being met by the CTMUHB Mental Health Service, and (2) to assess the knowledge and understanding of ASD amongst Mental Health Professionals in the CTMUHB Adult Mental Health Service.

2. What stage is the project currently at and what work has been completed to date?

Data collection and analysis is complete and thesis preparation is currently underway.

3. What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? (How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)

As this is a PhD project recording and reporting progress is achieved through supervision meetings and the production of written work.

4. What are the anticipated impacts and outcomes of the project? (What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)

The data obtained will be used to try to address two identified gaps in the literature to: (1) shape mental health services by exploring the needs of service users with co-existing ASD and mental ill health, and (2) to measure Mental Health Professionals' knowledge of ASD.

5. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

The Well-being of Future Generations Act (2015) is addressed as the findings from this project have the potential to enable better communication between adults with ASD and co-occurring mental ill-health and healthcare services therefore reducing health inequalities. In addition, this project aligns with a Healthier Wales as the findings have the potential to promote collaborative working and equity in things like ASD training.

6. Is there funding for this project? (Welsh Government, third-sector funding, Research).

This project is funded by a Knowledge Economy Skills Scholarship (KESS 2) in partnership with CTMUHB.

7. What data do you have to demonstrate the impact(s) of this project? (Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)

Phase 1 explored the perceived needs of service users with co-existing ASD and mental ill health, to establish whether these needs are being met by the Adult Mental Health Service in CTMUHB. Qualitative data was collected through semi-structured interviews.

Phase 2 explored the current knowledge and understanding that mental health staff within CTMUHB have of Autism Spectrum Disorder, via a questionnaire generating quantitative data.

8. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? (Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)

Thesis preparation is currently underway by the Doctoral student and at least 2 publications are anticipated.

Project title(s):

1. **MYCO-WELL D-ONE (IRAS 230693 & 253889) October 2017-September 2018; KESS 513467**
2. **UROGEN (IRAS 251053) October 2018 – September 2019; KESS 515592**
3. **The Antibiotic Guardian study (IRAS 269508) October 2019-Sept 2022; KESS 517027**

Univ Dept: Division of Infection and Immunity

UHB Dept: Department of Integrated Sexual Health

Key contacts: Professor John Geen; Dr. Lucy C. Jones

1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

i) All three of these related projects were research related. Clinical studies evaluating novel diagnostics but used to investigate bacteria and antimicrobial resistance for emerging sexual health pathogens. All three were used to support the achievement of post-graduate degrees (2 x MPhil and 1 x PhD) as well as correlate sexual health pathology observed in the CTMUHB walk-in sexual health clinic run by Dr. Lucy C. Jones to an advance panel of diagnostic investigations that were not available to the NHS at time of investigation.

ii) The research not only supported the attainment of post-graduate degrees for research staff, but also allowed the contribution of sexual health clinical nurses to contribute to the analysis and presentation of the data at conferences (both within CTMUHB R&D research days and nationally at other conferences). The studies were also used to advance the training on bacterial infections, antimicrobial resistance and antibiotic guardianship for the local Clinical staff through presentation to all relevant clinical staff to ensure smooth project running within the outpatient context of NHS treatment.

iii) All three projects evaluated the accuracy, specificity and sensitivity of developing clinical assays from commercial stakeholders, with the aim of improving the clinical service balanced against the cost of the assays and the relevance of the pathogens to frequency of related pathology. The Antibiotic Guardian study in particular was designed to evaluate the cost-benefit ratio of rapid diagnostics (costly) relative to the decrease in number of visits, spread of infection while awaiting diagnosis (up to 3 weeks by traditional NHS), doctor and nurse time for repeated visits (including those resulting from treatment failure due to lack of rapid antimicrobial resistance diagnostics) observed by a parallel cohort treated by traditional existing NHS practices. Unfortunately COVID has caused the suspension of the last project only months after it was started and remains paused due to implementation of distance consultation and stop of patient follow up examinations for healthcare worker safety.

2. What stage is the project currently at and what work has been completed to date?

1. MYCO-WELL D-ONE (IRAS 230693 & 253889) October 2017-September 2018; KESS 513467
This study is complete and has generated 2 peer-reviewed accepted manuscripts in scientific journals (doi: 10.1007/s10096-020-03993-7; doi: 10.1016/j.micpath.2019.103872), as well as at least one more manuscript in preparation. The student successfully defended his MPhil thesis, the assay was determined to be insufficient for clinical utility, but and the research stimulated the Mycoplasma genitalium testing implementation by Public Health Wales.

2. UROGEN (IRAS 251053) October 2018 – September 2019; KESS 515592

This study has completed clinical collection and is in the data analysis phase. One arising manuscript is in preparation and at least one more is expected to be generated. Of the two assays that were evaluated, one is in the process of being CE marked for IVD use, but published European guidelines on the target bacteria, has restricted it's utility to pregnant women for cost-benefit implementation. The combined data collected for 1 & 2 are expected to substantiate the importance of a new emerging bacteria (*Mycoplasma hominis*) as important to sexual health. The MPhil student has unfortunately withdrawn due to COVID-related health concerns.

3. The Antibiotic Guardian study (IRAS 269508) October 2019-Sept 2022; KESS 517027

This study started strong and was collecting relevant data and follow up data consistent with that expected over the 2.5 year data collection period. However, all Welsh clinical research projects not deemed to contribute to patient survival were suspended mid-March and subsequent alteration to patient evaluation (mostly remote) and no follow up for non-symptomatic patients has irreversibly impacted on the original aims. Closing of Dewi Sant

Hospital sexual health walk-in due to major construction will also impact on the ability to restart this study. Fortunately, the PhD student has been able to continue analysing and making use of the data arising from the previous 2 studies, which has been critical as the MPhil student from 2 had to withdraw. This will continue to produce peer-reviewed scientific publications (one has just been accepted for publication) that is a key metric for success.

3. **What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results?** (*How are you measuring your outputs /outcomes, and measuring against meeting the objectives?*)

All projects are KESS2-funded which have a strict monthly student progress reporting procedure and quarterly group evaluation of progress between academic and clinical partners. These are all filed and audited by the KESS office at Cardiff University. Post-data collection, analysis and publication of data do not have defined time lines, but are discussed regularly between the clinical and academic counterparts as part of the follow on project progress meetings (unbroken funding and collaboration for a 5 year period). COVID has impacted and will require a serious alteration to the original aims – however, the dissemination of the results through poster and oral presentations at the CTMUHB R&D conference and submission of manuscripts to peer-reviewed scientific journals remain on target.

4. **What are the anticipated impacts and outcomes of the project?** (*What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.*)

Personal: Each project has a student that is attaining a higher degree (MPhil or PhD). The data has also been utilised for a side project for a project to help one of the clinical team (Rebecca Davies) to attain a Master's degree which underpinned her successful application for promotion to Nurse manager. The publications underpin the capacity for Dr. Lucy C. Jones to apply for further and expanded funding to improve patient benefit.

Professional: All studies are designed to measure the frequency of sexual health pathogens (Mycoplasma genitalium, Ureaplasma urealyticum, Ureaplasma parvum and Neisseria gonorrhoea) that would account for treatment failure and the capacity to determine the association between an emerging pathogen (Mycoplasma hominis) to causing urethritis, pelvic inflammatory disease, cervicitis and vaginitis and determine the importance of testing for this organism in the future.

Health care/ patient benefit: All of these studies were taken on to evaluate implementation and measure change in faster time to patient symptom resolution, reduced patient visits, reduced spread of multiple resistant sexually transmitted bacteria. Particularly when looking at diagnostics for previously un-investigated pathogens. As a result of our first study, Public Health Wales launched a Wales-wide diagnostic service for Mycoplasma genitalium (albeit evaluating and implementing a different diagnostic platform better suited to their resources). Unfortunately, this advance for patient benefit has also paused due to COVID as the same equipment and overlapping reagents are required for COVID diagnostics.

The outcome for the Antibiotic Guardian study would have had the capacity to evaluate whether expensive overnight rapid diagnostic tests for M. genitalium and N. gonorrhoea would have been more cost effective than the traditional, slower and much cheaper methods utilised by Public Health Wales; unfortunately the loss of a year's (in March) data collection will likely leave this evaluation too underpowered to achieve a meaningful comparison.

5. **Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?**

Healthier Wales: Our research studies always improve the “make Wales a great place to work in health care” aim – as it provides environmental enrichment for the clinical staff through the engagement and presentation of new diagnostics and associated pathogenesis accompanying the implementation and conclusion of each study. The “single system” aim has been met by our stimulation for Public Health Wales to implement a Wales-wide platform for Mycoplasma genitalium testing and incorporation of it into the postal “Frisky Wales” initiative and directly relates to all three projects evaluation of diagnostics before they are available for IVD, that also provide therapeutic guidance based on resistance profile for the bacteria (“health care services will use the latest technology and medicines”)

Future Generations: Our studies have both directly and indirectly supported further qualification attainment of staff as part of the primary focus of the research projects. It has also been important to the development of a high-quality research portfolio to underpin successful funding for the future expanding research by the CTMUHB clinical lead, Dr. Lucy C. Jones. Furthermore, all research arising from Dr. Jones is always directed at improving health care and clinical benefit to patients. Research improving sexual health care, has important social implication as well given the social stigma and importance of this area of medicine to social interactions and relationships.

6. Is there funding for this project? *(Welsh Government, third-sector funding, Research).*
All three studies were funded through industrial co-partnerships via the KESSII research program (WEFO funding administered from the central administrative hub at Bangor University). Funding required peer-review and approval was contingent on competition for available funding. This also allowed for additional funding for the first 2 projects to be attained by adoption to the clinical portfolio. The academic and local clinical teams participated in securing this financial support directly to CTMUHB R&D department to fund the participation of the research nursing pool (combined funding attained 130k for (1) and 80k for (2))- however the funding structure has changed for (3) therefore, it is unclear how much this project has directly contributed to R&D support. The research nursing pool and admin staff were essential for completing IRAS applications and directly participating in the studies making this a mutually beneficial relationship between our research and Professor John Geen's team.

7. What data do you have to demonstrate the impact(s) of this project? *(Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)*
All covered above: changes to Public Health Wales screening approach, post-graduate degrees initiated (and in some cases completed) by academic and clinical staff, cost-benefit analysis of rapid and/or novel tests to the prevalence of antimicrobial resistant sexually transmitted bacteria. And 3 accepted publications in good peer-reviewed scientific journals to date with many more anticipated.

8. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? *(Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)*

Very difficult to say due to COVID – almost all research has shifted to COVID-related healthcare concerns, including the direction of our main clinical partner, Dr. Lucy C. Jones. We remain supportive of the 3 new studies that she has started (CROWN, CROWN-Family, and the new diabetes related project) but only in a sample handling/conduit fashion. The lead academic partner (Dr. Owen Spiller) has recently been promoted Department Head of Medical Microbiology and will maintain strong research related interests with Professor John Geen and Dr. Lucy C. Jones for the future. However, as COVID is likely to be a transient research initiative, it is difficult to speculate what the research priorities will be for bacteria and antimicrobial resistance once it has been brought under control.

Project title: Developing an occupational therapy intervention for people living with early-stage dementia.

Univ Dept: School of Healthcare Sciences

UHB Dept: Research and Development

Key contacts: Bethan Edwards (PhD Candidate), Ben Hannigan and Teena Clouston (PhD Supervisors), Professor John Geen and Rhian Beynon (CTM R&D).

1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

This is a research project, which is being undertaken as part-fulfilment of the PhD candidate's PhD. Bethan is a CTM UHB employee and is line managed by the CTM's R&D department, who have paid all tuition fees.

The study seeks to develop an occupational therapy intervention for people living with early-stage dementia to inform the delivery of services in CTM. It consists of 3 work-packages: -

1. Evidence Synthesis
2. Semi-structured interviews
3. Co-production workshops

These will inform the development of an intervention logic model and intervention contents / components using an Intervention Mapping Approach.

2. What stage is the project currently at and what work has been completed to date?

The study / PhD is currently in the writing up phase – all data generation has been completed.

3. What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? (How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)

This is a PhD and therefore metrics used to report and record PhD progress within the School of Healthcare Sciences are being adhered to.

4. What are the anticipated impacts and outcomes of the project? (What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)

As a PhD this study will have personal impacts for the PhD candidate.

Organisationally the PhD has already informed the development of services in CTM. Evidence generated was used to inform an application for funding for an OT Memory Assessment Service through the Welsh Government's Dementia Action Plan. This application was successful and circa £450,000 of ongoing funding was secured for the service.

5. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

6. Is there funding for this project? *(Welsh Government, third-sector funding, Research).*

CTM have paid all tuition fees and the candidates salary.
£10,000 was also received from the Royal College of Occupational Therapists, through their 2017 UKTROF awards.

7. What data do you have to demonstrate the impact(s) of this project? *(Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)*

This is a research study generating qualitative data.

8. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? *(Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)*

PhD submission date is February 2022, however it is hoped that the study will be completed prior to this date.

Project title: The Pro-Judge Study: An Ethnographic Examination of Nurses' Professional Judgement in Nurse Staffing Systems in England and Wales

Univ Dept: HCARE Sciences [in collaboration with KCL and University of Canterbury]

Chief Investigator: Professor Davina Allen

1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

RESEARCH

Summary

This project is an in-depth ethnographic study of nurses' use of professional judgement in making decisions about the deployment and organisation of the nursing workforce to meet patient need. We know very little about the use of professional judgement in this context and its impact on decision-making. This research addresses this gap in understanding, taking advantage of the recent impact of service configuration in response to the Covid-19 pandemic and national differences in nurse staffing systems between England and Wales.

Context

Ensuring adequate numbers of nurses are available to care for patients in response to shifting demand is an international policy priority. In England and Wales, guidance on nurse staffing systems advocate a 'triangulated approach', combining evidence-based planning tools, nurse sensitive outcome data, and professional judgement. Emerging evidence on the use of formal workforce planning technologies (Burton, 2016) and safe staffing policy implementation in England (Ball et al, 2019) highlights both the centrality of nurses' professional judgement in nurse staffing systems and the urgent need for research to better understand its contribution to decision-making. The need to reconfigure services and deploy staff in response to demand surges in the context of the Covid-19 pandemic throws such decision-making into sharp relief.

Questions

- How do clinical leaders and nurse managers deploy professional judgement in assessing need, planning staffing levels, deploying nurses, and organising nursing work in response to changing demand patterns?
- What are the skills and knowledge that underpin nurses' professional judgments on staffing decisions?
- How do nurses articulate professional judgement in nurse staffing decisions?
- What weight is given to professional judgement in the triangulated approach to staffing decisions?
- What is the relationship between professional judgement, planning tools and nurse sensitive patient outcomes data?
- Are there elements of nurses' professional judgement that could be supported by new measurement or decision tools?

- What are the implications of the research for nurse education, professional development and leadership?
What are the implications of the research for nurse staffing systems and future policy and practice?

A cross-case comparative design is proposed. CTMUHB is one of 6 case studies participating in the study.

2. What stage is the project currently at and what work has been completed to date?

Support for the study in principle from Greg Dix, but progressing through formal site R&D processes. Meetings set up for February.,

3. What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? (How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)

These are specified in the study protocol.

What are the anticipated impacts and outcomes of the project? *(What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)*

Significance

Professional judgement is a central pillar of the triangulated approach to nurse staffing decisions in England and Wales, but we know little about its use in practice. By opening up this “black box” for the first time the research will develop understanding of the dynamics of nurse staffing decisions; the knowledge that informs professional judgement; the relationship of professional judgement to formal tools and quality indicators; and the support necessary to facilitate leadership at different levels within the organisation.

The research will:

- make visible the knowledge and skills that underpin professional judgement in nurse staffing decisions and provide a language with which to articulate this;
- lay the foundations for evidence-based programmes of nurse education and continuing professional development;
- furnish the evidence to inform the development of nurse-led decision support tools to augment professional judgement; and
- generate wider insights into the effectiveness of nurse staffing systems in practice.

4. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

The study is not explicitly aligned, but ensuring that nurse staffing levels are sufficient to meet patient needs is foundational to both strategies.

5. Is there funding for this project? *(Welsh Government, third-sector funding, Research).*

Yes, funded in part by the RCN Foundation.

6. What data do you have to demonstrate the impact(s) of this project? *(Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)*

Not at present.

7. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? (Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)

The study timelines are being formalised with the funders as we have needed to adjust these in the light of the pandemic. Indicative completion date is spring 2022.

Project title: Digitalisation of SEREN and BERTIE

Univ Dept: College of Biomedical & Life Sciences

UHB Dept: Innovation Hub

**Key contacts: James Kinsey-Jones and Sue Bevan Cardiff University
Nirupa A D'Souza Cwm Taf Morgannwg UHB Consultant Paediatrician**

1. What are / were the background of the project and what key aims and objectives have been identified?

- *(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)*

The COVID-19 pandemic has seen an urgent need to be able to offer alternative educational delivery, and this is not just from a schools/colleges/university perspective, but also from a Health perspective. As part of this we have been working with Welsh Industry partners and the SEREN group and Bournemouth Diabetes & Endocrine Centre (BDEC) are collaborating to combine the SEREN® face-to-face programme for children with the BERTIE® online and face-to-face Type 1 Diabetes (T1D) programme for teens and adults to create 'BERTIE/SEREN Digital', a single, structured, comprehensive online education, support and self-management programme for everyone with T1D.

BERTIE/SEREN Digital will provide a patient centred self-management resource for people who are unable or unwilling to attend face-to-face courses or where course availability is poor but will also be complementary to the established BERTIE and SEREN courses. The new programme will be developed with the needs of international markets in mind and will be adaptable to other languages, cultures, and units.

By developing a full suite of education programmes on the same platform the aim is to provide support for everyone with T1D regardless of age, socio-economic status, culture, language and educational status, with user choice allowing those with language and learning difficulties to access programmes written in appropriate formats to include resources to accommodate those of all educational abilities.

As a health-board CTMUHB has three district General Hospitals and 4 community hospitals as well as numerous other sites where there is the potential to deploy this digital package, and to collect data for Cardiff University to evaluate.

Cardiff University will work with the SEREN group, BDEC and MWDH to design and run evaluations, data collected will be used to establish the benefits (if any) of digitalising the education programme, a health economics piece of work will also be completed.

2. During What stage is the project currently at and what work has been completed to date?

All collaborators are in place, and the hope is that the project will be able to start by February 2021.

SEREN group and BDEC have been working together for some time with MWDH to develop BERTIE/SEREN Digital's technical scope. The SEREN group (CTM UHB is part of the SEREN Group) and BDEC will provide clinical direction and input to the joint project, and MWDH will take the lead and be responsible for the technical development of the new platform.

What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? *(How are you measuring your outputs /outcomes, and measuring against the meeting the objectives?)*

This project aims to develop a world-leading digital platform that will help improve access to and uptake of structured T1D education, in line with NICE recommendations, improve the self-management skills of people with T1D, and improve their overall diabetes control and self-efficacy to empower those with diabetes to self manage. This research collaboration will produce high quality quantitative performance data on the effectiveness of this new educational package this will enable the product to show academic rigor.

The key outputs will be the data package and the analysis and publications in reputable research journals and from this, wide dissemination of the performance characteristics of the products for industry and public awareness.

What are the anticipated impacts and outcomes of the project? *(What is the project doing? Who is it benefiting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)*

MWDH and Rondo Media will have a new and approved proprietary product, which can be made commercially available to both the public and private market place.

The NHS partners in Wales and England will have access to new educational digital technology, MWDH will actively work with the NHS partners to ensure that this will be fit for purpose.

This project will provide the basis for future collaborative projects between NHS England and NHS Wales.

Provide a single, structured, comprehensive online education, support, and self-management tool/programme for everyone with T1D

The reduction in the need for face to face time will hopefully be captured by the Health Economist, there is an expectation of significant cost savings for the NHS and better patient outcomes.

The data and evaluation results may also contribute to scientific posters and presentations at conferences. The aim will be to effectively communicate the information to the public.

This may enhance the reputation of all of the collaborators with respect to their work around the digital delivery of Health information.

The outcomes and impact of this collaboration will have significant benefit to Cardiff University, these include:

- Increased collaboration between Cardiff University, CTMUHB and other Health Boards may, result in a platform of further Research and Development projects between the partners.
- This R,D&I platform provides significant opportunities for Increased grant income potential and research staff employment
- New data to support development of further digital health interventions.
- Potential for peer-reviewed publications
- Increased support for the University's Civic Mission agenda
- Industrial collaboration directly supporting the University's performance in REF 2021

3. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

This project will, if proved successful, will lead to a healthier Wales with increased resilience and prosperity given the prospect of increased health for patients, staff and increases in industry growth and employment.

This project is a key example of collaborative RD&I bringing together a Welsh industry, HB and HEI to enable people, staff and patients to stay well by reducing infection, reduce hospital stay and treatment costs.

4. Is there funding for this project? (Welsh Government, third-sector funding, Research).

There is limited funding available through the WEFO/ERDF Accelerate project, however Cardiff University, and the SEREN/BERTIE group is providing match funding as part of the project, as is the Industry Partner

What data do you have to demonstrate the impact(s) of this project? (Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)

The capture and evaluation of the data collected across the partner organisations will allow for research work to be undertaken that will produce quantitative data that will demonstrate increased patient safety by ensuring that all patients have access to the same consistent information across all the partners, reducing inaccuracies and or mis-information.

What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? (Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)

This project is planned for 12 months at the outset, there may be delays due to COVID-19, staff shortages, or cessation of research at Cardiff University (due to COVID-19), etc.

This type of activity is a key indicator of the Academic partnership we have with Cardiff University and will be incorporated in the upcoming review of University Health Board status.



Project title: Operating Theatres Recycling

Univ Dept: School of Medicine & Engineering

UHB Dept Innovation Hub & Astute

Key contacts: Barbara Cole & Sue Bevan

Michael Packianather PackianatherMS@cardiff.ac.uk *Jacqueline Marsh* MarshJL@cardiff.ac.uk

Tom Powell (CTM UHB - RIIC Hub) Tom.Powell2@wales.nhs.uk ; **Elizabeth Thomas (Cwm Taf Morgannwg - Corporate Development)** Elizabeth.Thomas252ccb@wales.nhs.uk

1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

Cwm Taf Morgannwg University Health Board (CTMUHB) produces over 2,000 tonnes of waste annually with the Operating Theatres and Pathology Laboratories identified as areas that produce the greatest quantities. A large part of this waste is the packaging of consumable products that are routinely used on a per patient basis. The evaluation of this waste into correct categories for disposal, recycling or incineration will us to accurately quantify the volume of plastic waste, specifically plastic packaging used.

There is clear policy impetus in Wales from the Future Generations Act for sustainable approaches in terms of how health and care services are delivered. The way in which we procure consumable items and working with key suppliers could be key to achieving our Future Generations Act obligations and help aid the recycling of waste material.

Additionally working with industrial partners we intend to explore potential pathways for waste into new products, creating a circular economy by changing unrecyclable plastic packaging, avoiding landfill and reducing cost to the CTMUHB.

This collaborative RD&I project will bring together working clinical environments and conditions to enable real-life evaluation and explore human behaviour/acceptance to change /education/training and implementation of innovation to increase recycling capability with the support of industry and academia;

CTMUHB

- Clinical environment
- Clinical staff and theatre staff involvement and input
- Innovation expertise and disruptive change management

Industry

- Increased collaboration with Industry partners
- Identify possible research opportunities of working in collaboration with Industry
- Identify opportunities for further projects
- Identify possible student placement opportunities
- Identify possible KESS/KTP opportunities

Academic input

- Academic involvement is a key metric of this project, so as to ensure academic rigor of the project
- Shared knowledge in relation to recycling and opportunities within HB of suitable plastics
- Academic involvement to ensure best practice
- Collection and Evaluation of data collected
- Identify possible commercial opportunities

• **Resource from Accelerate**

This project aims to change staff behaviour by demonstrating the impact of improved recycling behaviour. This will be supported with education, training, measurement and academic evaluation.

2. What stage is the project currently at and what work has been completed to date?

There has been a great deal of time already invested in drawing all of the partners together for the project, and we are now starting to see the results of this investment of our time. The project duration will be around six months, and we are just at the start of this timetable.

There is significant interest around the impact of waste and in particular the way in which plastic material is both used and recycled within the Health Board. Accordingly, there has been a growing awareness of the issue within CTMUHB Health board and staff in several QI projects and innovation streams have started to consider this more and more. To date we have in collaboration with partners completed the following:

- An initial study by a PhD KESS student has provided rudimentary baseline information, which has been used to identify the classes and volumes of waste produced daily.
- A design student from a Cardiff Met has looked at redesigning the bins space in operating theatres.
- An order for 90 bins has been submitted, these bins will be used across a number of CTM sites and will be distributed as soon as received by the HB.
- Veolia and BPI (Local Welsh recycling companies) are keen to support innovative work and have already shared information and support on recycling opportunities that we are looking to link to another project we have with CTM.
- We have been asked to join a large funding application to NERC with regard to hospital waste and recycling.

What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? *(How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)*

Establishment of waste categories and realising the potential of high value/high weight/high volume waste (e.g surgical steel)

Establish a forum for interested UHB staff to attend and find out more, capture and describe individual projects ongoing and publicise these.

Establish future projects and external funding with industry links and academic partners

What are the anticipated impacts and outcomes of the project? *(What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)*

Change Staff Behaviour :

- Techniques and tools to help staff recycle better
- Combine education & measurement (survey / training
- Increase engagement of NHS staff to identify possible waste to recycle (What materials have recycle potential?)
- Increase engagement of NHS staff in identifying possible 3D design objects
- Circular Economy : Design 3d items, Art (What materials have waste potential?)
- New bins protocol.

Economic/Environmental Value

- Look at the economic value of recycling of Plastic waste
- Look at the environmental impact from recycling of waste, consider upscaling
- Identify new process for dealing with clinical waste, this could be rolled out across NHS Wales
- Consider the increased engagement of NHS staff in identifying waste products for recycling
- Possible new products to market
- Possible Health Economic benefit

Impact

- Reduced Cost to CTM UHB by reducing waste management costs
- Reduced environmental impact
- Beacon for what is achievable in NHS Wales

We are also lining with eh sustainable theatres project and colleagues in the WEAN network to share the details of this project.

3. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

There is clear policy impetus in Wales from the Future Generations Act for sustainable approaches in terms of how health and care services are delivered. The way in which we procure consumable items and working with key suppliers could be key to achieving our Future Generations Act obligations and help aid the recycling of waste material.

This project is a key example of collaborative RD&I bringing together a Welsh industry, HB and HEI to enable a better working ethos to support the ideas of staff, reduce costs, waste, time and resources.

4. Is there funding for this project? *(Welsh Government, third-sector funding, Research).*

There is limited funding available through the WEFO/ERDF Accelerate project, however Cardiff University and the CTMHB is providing match funding as part of the project, as is the Industry Partner

5. What data do you have to demonstrate the impact(s) of this project? *(Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)*

We have already collected some data by way of the PhD KESS student, this data is based on the types and volumes of waste produced by the operating theatres.

Procurement have been asked to help identify the most widely used products coming into the HB.

The Pathology labs at CTM UHB will be identifying their plastic waste, and as part of the project, and will be collecting this waste data as part of this project.

As above the Bridgnd Field hospital will be identifying their plastic waste, and collecting relevant data as part of the project.

The different Operating Theatres across CTM UHB who are involved in the project will also be identifying the various plastics and associated data in relation to volume

- 6. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ?**
(Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)

We continue to work with CTM UHB to identify possible projects and look at how these can be linked to the University in order to be of benefit to all partners.

This type of activity is a key indicator of the Academic partnership we have with Cardiff University and will be incorporated in the upcoming review of University Health Board status.

Project title: Working in Partnership to Develop a Learning Outcomes Approach to Clinical Placements for Paramedics and Nurses

Univ Dept: CHHS

UHB Dept: Clinical Education, Royal Glamorgan Hospital

Key contacts:

1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

This project is related to Education & Training

CTMUHB provides practice placements for both paramedic and nursing students in partnership with Swansea University. A situation had emerged within the health board (HB) where it was increasingly challenging to manage the demand for paramedic student placements within the Emergency Department (ED) at the Princess of Wales Hospital. There was a real risk of breakdown of communication and placement provision between Swansea University and the health board.

Further exploration of the situation revealed that the ED was a 'hot spot' for student placements where the demand for student placements, from multiple healthcare professions, was potentially exceeding capacity in what is a relatively compact department, and this was creating an unacceptable risk to patient care. In addition, the clinical educators in the ED were becoming increasingly frustrated with the quality of placement they felt able to provide for these students.

Issues included:

- A lack of clarity of required placement objectives between the university, the clinical educators in practice and the student.
- Constraints in terms of number of days / weeks of placement required in a particular area, leading to inflexibility and staff time wasted in multiple inductions, as students return to the HB at different times throughout the academic year.
- The impact of too many people (multiple HCPs and students) in a restricted space where patients were being treated in an emergency setting.
- Potential for better planning for the students across the placement areas

It also became apparent that there were multiple areas within the hospital site that were taking paramedic placements, due to historic arrangements, and there was no join up for the UHB or the students through those placements again resulting in more instances of the issues articulated above.

An emergency meeting was held between Swansea University and the UHB to seek resolution. A wide-ranging discussion explored the issues for the UHB and the HEI and potential opportunities for resolution. Following these discussions, a project proposal was developed and submitted to Health Education & Improvement Wales (HEIW) to request funding. There are two key aims to this joint service improvement project:

1. To implement and evaluate the impact of utilising a learning outcomes-based approach to paramedic students' clinical placements.
2. To explore the availability and capacity of learning outcomes-based placements for nursing students within WAST (across all areas of clinical operation, not only emergency care).

2. What stage is the project currently at and what work has been completed to date?

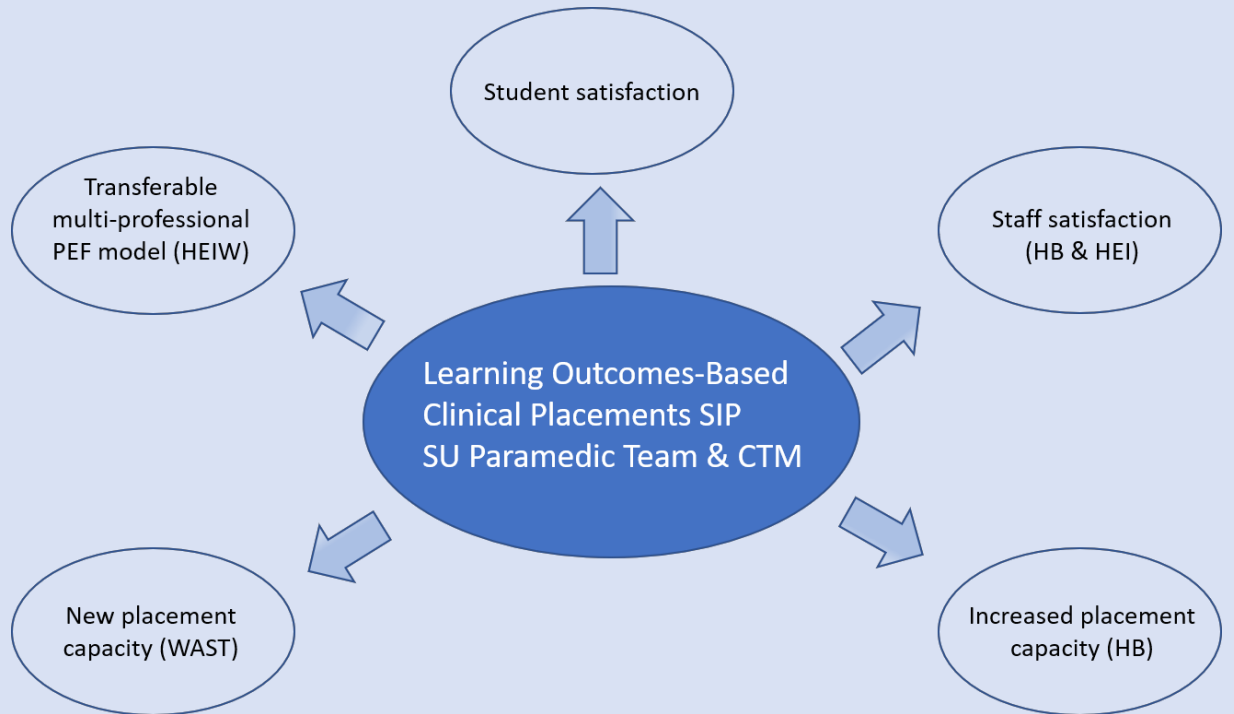
We received funding from Health Education & Improvement Wales (HEIW) for this project, which started in December 2020. The funding is being used to pay for a Practice Education Facilitator (PEF) to work one day per week in CTM. The PEF is currently meeting with relevant staff in the HB and in the CHHS paramedic team and is learning about the placement and assessment requirements and associated digital portfolio and systems used in CHHS.

3. What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? (How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)

Objectives		Outcome Measures
1	Develop a shared understanding of the learning outcomes and clinical competencies students must achieve; identify appropriate clinical environments within the HB that would offer learning opportunities to facilitate students' achievement of these outcomes, and develop effective processes to review / audit placements periodically	Agreed (CTM and SU) policy for paramedic student placement allocation between CTM and SU, including a joint educational audit and review process produced <i>This document may be suitable as a template for practice placements in other disciplines, therefore key transferable processes / content will be highlighted</i>
2	Develop student-centred, HB-wide placements with appropriate student induction, supervision, and assessment / sign-off against specified learning outcomes / specific clinical skills, plus appropriate orientation of supervisors / mentors to the students' Clinical Practice documentation	Placement handbook detailing format and structure of placements, including requirements for supervision and induction arrangements, learning outcomes with relevant placement environments where students could achieve these outcomes, contact information for SU and HB personnel, relevant policies, e.g., raising concerns in practice, H&S, etc., produced <i>This document may be suitable as a template for practice placements in other disciplines, therefore key transferable processes / content will be highlighted</i>
3	Consult with SU Nursing programme team and WAST to explore potential availability and scope of placements for nursing students, identifying barriers to placement provision and possible solutions	Outcome of discussions and suggested actions to progress this initiative reported?
4	Assess stakeholder satisfaction with new placement model	Survey stakeholder satisfaction
5	Monitor placement capacity	Compare historic placement capacity against new model (no of students per HB)
6	Identify placement model and resource requirements (including multi-professional PEF role)	See measures for objectives 1 & 2 and establish delivery model

4. **What are the anticipated impacts and outcomes of the project?** *(What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)*

Figure 1: Balanced Scorecard for Project Evaluation



Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

An ageing population, lifestyle changes, public expectations, new and emerging medical technologies (Healthier Wales 2018 WG), a National Integrated Medium-Term Planning process for NHS Wales, combined with improving workforce planning across the HBs has led to increased demand for new entrants to all healthcare professionals.

The training of most health professions requires a blended mixture of learning in both academic and practice environments. To achieve this universities have developed required practice placement definitions and these placements have been delivered within health boards.

As the numbers of students increases so does the demand for practice placements. This in turn puts increasing pressure on the placement providers, already under pressure from staff shortages. The situation we find ourselves in requires transformation of the way we are currently working.

Ways to increase capacity while maintaining high quality practice placements must be identified to meet the needs of all partners concerned and co-create the healthcare professional workforce needed to meet the health needs of our population now and in the future.

5. **Is there funding for this project?** *(Welsh Government, third-sector funding, Research).*

HEIW have awarded £10K to the project team for this project. £6K is being used to pay for the PEF salary, with a further £4K for project management split equally between Janet Gilbertson in CTM and Nikki Williams in CHHS.

6. **What data do you have to demonstrate the impact(s) of this project?** *(Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)*

Evaluation of the impact of the service improvement will include:

- Measuring stakeholder satisfaction using an online questionnaire

- Determining any increased placement capacity by measuring the number of students accommodated within the HB and any projected increase in nursing placement capacity identified through discussions with WAST
- Identifying the transferability of the PEF role and placement processes

7. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? (Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)

This project is scheduled to be completed by July 2021.

Project title: Health and Social Care Research, Innovation and improvement activity mapping.

Univ Dept: Swansea University School of Medicine

UHB Dept; Research and Development Dept and RPB Research, Innovation and Improvement Co-ordination Hub,

Key contacts: Dr. Tom Powell

1. What are / were the background of the project and what key aims and objectives have been identified?

(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

Health and Social Care Research, Innovation and Improvement Mapping:

The Parliamentary Review on Health and Social Care in Wales (2018) deems the current model of providing health and social care services across Wales 'unsustainable'. In response, the Welsh Governments long term strategy for Health and Care in Wales 'A Healthier Wales' identifies a need for transformation, supported by the development of a seamless system of health and social care which is underpinned by Research, Innovation and Improvement (RII) activities. To support this, A Healthier Wales recommended the establishment of a number of regional hubs to co-ordinate and drive RII activity, which in turn have been established as the RPB RIIC Hubs. To inform their emerging strategy and understanding of the regional RII landscape in the CTMUHB areas, the Welsh Government has tasked each RIIC to undertake a baseline RII landscape mapping exercise, which should identify examples of Health and Social Care related RII activities currently ongoing across the region. The objectives of this project are thus to provide a comprehensive overview of Health and Social Care RII activity currently ongoing across the CTM region, which is accompanied by appropriate analysis and description.

2. What stage is the project currently at and what work has been completed to date?

The project is currently nearing completion, with the final report to be issued over the next couple of weeks. This has involved mapping the Health and Social Care RII landscape across the region, involving desk-based approaches, surveys and interviews with key stakeholders across Health and Social Care.

3. What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results? (How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)

The researcher is in consistent communication with representatives from CTMUHB with findings being communicated on a continual basis. The final report, that will be issued over the next couple of weeks, will be used to disseminate major findings of the research with wider partners.

4. What are the anticipated impacts and outcomes of the project? (What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)

The project will provide an overview of current Health and Social Care RII activities ongoing across the CTMUHB region. Findings from this report will be used to inform the emerging future strategy of the CTM RPB RIIC Hubs, with other similar projects undertaken across other regions in Wales having also supported the development of health board strategies. Ultimately, the project aims to

identify and support the future development of Health and Social Care RII activity across CTM, which could lead to the transformation of health and care services in the region, with positive impacts on patient health outcomes and service efficiency.

5. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies ?

This project is heavily linked to the aims of the Healthier Wales Strategy. The project will identify examples of best practice relating to how CTMUHB is encouraging integration between health and care services, transferring services into the community, supporting the development of the latest technology and medicines, adopting community based approaches to services and supporting people to stay well.

6. Is there funding for this project? (Welsh Government, third-sector funding, Research).

This project is funded by the Regional Partnership Board Research, Innovation and Improvement Co-ordination Hub using Welsh Government transformation funding.

7. What data do you have to demonstrate the impact(s) of this project? (Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)

The project has collated a vast amount of data and information regarding RII activity ongoing across the CTM region, which will be shared alongside the final report.

8. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? (Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)

Potential future work that will follow on from the project that has been described in the body of this document is currently being discussed between partners.

Project title: Ward based e-Whiteboard Implementation

Univ Dept: Healthcare Technology Centre (HTC) – Swansea University Medical School

UHB Dept: Innovation and Quality Improvement

Key contacts: Dr Tom Powell, Nerys Lloyd

1. **What are / were the background of the project and what key aims and objectives have been identified?**
(Is the example i) Research, ii) Education and Training iii) Innovation, iv) Corporate Responsibility)

The e-whiteboards project was a collaborative R,D & I project between HTC, the Assistive Innovation Technology Centre (ATiC) at the University of Wales Trinity St David and CTMUHB to investigate the user experience of the e-whiteboards which are currently deployed across the health board. The insights gathered during the project would then be used to feed into the development of new features and visuals for the boards.

Prior to the start of this project CTMUHB had completed the first phase of an innovative project to develop a bespoke digital whiteboard that draws in patient information from hospital data systems, as well as manually inputted live ward data. It displays the information on a large TV screen. Liam Morrissey, head of software development, and colleagues had led the rollout to wards in the Royal Glamorgan and Prince Charles Hospitals. At the time, the current version had been met with widespread approval and buy-in, it is a working prototype, and there are many additional features and improvements possible to make it an appealing and effective product.

As part of the project the university partner aimed to support CTMUHB in investigating possible improvements to the whiteboards and evaluating their impact.

2. **What stage is the project currently at and what work has been completed to date?**

The project is now complete. Outcomes & deliverables from the project included:

- Phase 1 report detailing the user experience of key health board personal that interact with the e-whiteboards on a daily bases. This was collected during 6 shadowing/interviewing days across three hospital sites within the health board.
- Phase 2 report detailing the user feedback.co-creation, icon prototyping, layout and usability. The survey was designed in collaboration between ATiC and Water following interpretation of the feedback collected in phase 1. In addition to icon feedback, the results of the survey contained rich information about the whiteboards visual language, current use, visual preference and opinions on potential new features.
- Icon Style Guide
- COVID-19 Icon Style Guide

3. **What are the metrics of your project and do you have a strategy for recording, reporting and disseminating progress / results?** *(How are you measuring your outputs /outcomes, and measuring against meeting the objectives?)*

Regular project team meetings were held with representative from each of the partners required to attend thus ensuring finding were being communicated on a continual basis. Following completion of the project a final report was issued to CTMUHB with the major finding of the research.

4. What are the anticipated impacts and outcomes of the project? *(What is the project doing? Who is it benefitting? Anticipated outputs could include personal (e.g. career progression), professional, organisational, health care, patient benefits (outcomes / experience), environmental, etc.)*

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- Icon Style Guide
- COVID-19 Icon Style Guide

5. Can you evidence any demonstrable links to the aims and objectives of the Wellbeing of Future Generations Act and A Healthier Wales strategies?

This project is linked with the aims of the Healthier Wales Strategy. The implementation and improvement of the e-whiteboard system will enable staff in CTMUHB to use the latest technology for ward management, enabling the staff to be proactive rather than reactive thus improving communication between team (we need to everyone to work together).

6. Is there funding for this project? *(Welsh Government, third-sector funding, Research).*

This project was supported by the ERDF funded Accelerate program.

7. What data do you have to demonstrate the impact(s) of this project? *(Research, quantitative/qualitative data, patient experience improved outcomes, change in delivery, financial benefits, risk reduction / safety)*

None. A follow up study would need to be undertaking making a comparison of pre and post implementation of the deliverable for this project.

8. What future work do you have planned OR is considered a priority with Cwm Taf Morgannwg ? *(Do you have a timeline for the completion of this work with tangible benchmarks? Do you have a plan for the next financial year?)*

The project has concluded. Currently there are no plans for a follow up.



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives

UWTSD Triennial Review UHB Status Workshop

A whistle-stop overview of research & education within the health & care arena

University of Wales Trinity St David

Yr Athro Wendy Dearing & Ian Wells



www.uwtسد.ac.uk



Wales Institute of Digital Information
Athrofa Wybodaeth Ddigidol Cymru

“Accelerating the use of digital technology to improve the health of Wales by putting the person at its core.”

Three key pillars;

- Workforce & skills development
- Research & development
- Product & service innovation

USW formal partner of WIDI (Prof. Andrew Ware)



“We want to create a high energy sustainable institute that is able to move seamlessly between the areas of research, product and service innovation and workforce and skills development”

The Federation for Informatics Professions, FEDIP, is the only public register for all informatics professionals dedicated to delivering better health and care through the advanced use of technology to support this –**all UWTSD programmes are accredited by Fed-IP**

- ❑ Digital Degree Apprenticeships – Three pathways
- ❑ Level 2-4 Health Informatics Apprentice
- ❑ **PhD opportunities**
- ❑ CertHE Skills for the Workplace (Computing)
- ❑ University offer 40credit certificate, staff can choose two suitable Computing modules to gain this qualification
- ❑ NWIS staff teaching & master classes



NWIS PhD students

Managing the centralisation of IT services within NHS Wales

Michael Jenkins MSc. BSc. (Hons).
Senior Product Specialist (Cancer Services)

The Common Law Duty of Confidence and the use of patient information in direct and indirect care

Andrew Fletcher
LLM, LLB (Hons), PGDip (LPC)

The Role of Clinical Modelling and Knowledge Management in NHS Wales
John Meredith MSc, Mphil, BSc
NHS Wales Informatics Service

Abstract

NHS Wales faces challenges in delivering strategic, purposeful and beneficial electronic patients systems. An undertaking to work more collaboratively and effectively with the patient can be delivered through the application of Personal Electronic Health Record (PEHR) systems. Literary and anecdotal evidence exists of various benefits & challenges.

This research considers the prospect of these PEHR challenges facing NHS Wales and aims to make explicit recommendations.

Darren Reynolds BA (Hons), MSc



The Topol Review

In summary, the Topol review states there needs to be a “renewed focus on workforce development” if digital transformation is to be achieved in the NHS.

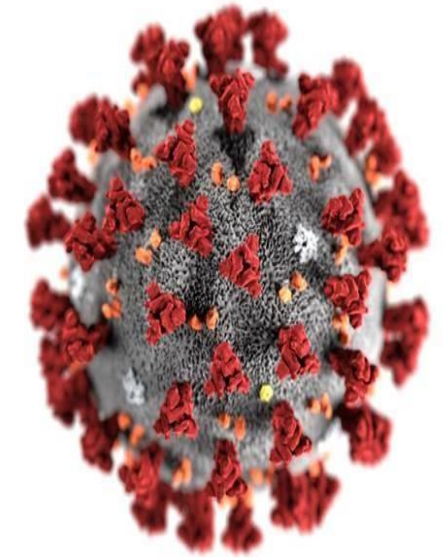
It adds: “To reap the benefits, **the NHS must focus on building a digitally ready workforce** that is fully engaged and has the skills and confidence to adopt and adapt new technologies in practice and in context.”

“Implementing health IT is one of the most complex adaptive changes in the history of healthcare, and perhaps of any industry.”

Prof Bob Wachter

The Topol Review also identifies the need to focus on the development of the digital professional workforce who will be an increasingly essential part of the health and social care workforce. This is being addressed as part of the Welsh Government’s Digital Transformation Programme





WIDI are working on several research projects with NWIS and various health boards, including:

- 1. Welsh Parliament Research Report**
- 2. COVID-19 Comorbidity Population Risk Profiling**
- 3. Human Data Interaction in the Development of the Welsh Patient Portal**
- 4. Predictive modelling and AI for patient health monitoring**
- 5. Urology trials Web portal Swansea Bay UHB**



Actual & potential collaborating on with CTMUHB

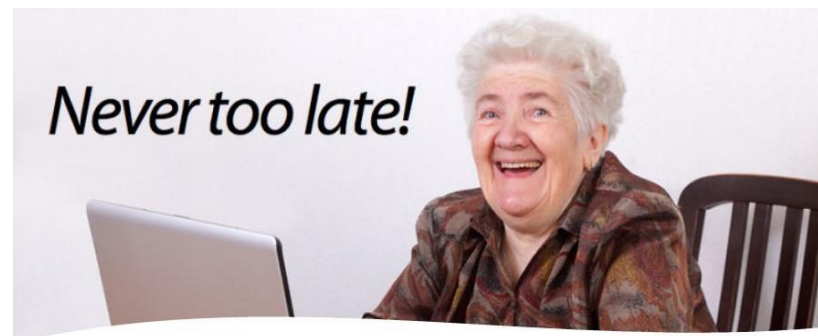
- Staff on both the degree & level 4 Health Informatics apprentice programme
- E Whiteboard project
- Shared learning starting Feb 20210 originally for Health Informatics
- Starting Sept 21; The Digital Professional Masters building on the lessons learnt from the nursing e documentation project —producing a generation of digital transformers & leaders
- Digital Inclusion building on the Digital inclusion Charter Wales Coop/Digital Alliance to support citizens in a complex digital world
- Floated internships/student projects/industry placement
- MRes/PhD
- Conversations re research with Kelechi which can be taken further due to expansion & additional funding of WIDI



- ✓ Bespoke repeatable sports helmet for craniosynostosis.
- ✓ Specialised seating for multiple users and healthcare environments.
- ✓ Developing patient-centred healthcare decision making and consent.
- ✓ Co-development, prototyping and consumer feedback of a microneedle patch applicator.
- ✓ Future theatres - developing a sustainable model for operating theatres.
- ✓ Dynamic postural support for wheelchair users.
- ✓ Development and evaluation of e-whiteboards within clinical ward environments.
- ✓ Digital communication and support for people living with Dementia.
- ✓ Posture Smart Chair with haptic & sensing technology to encourage positive behavioural change
- ✓ Inflatable moving and handling equipment for the global healthcare market.
- ✓ Developing infection control protocols for safe deployment of VR in healthcare.
- ✓ Communication & Clear Face Masks: Remote User Testing
- ✓ Patient feedback system for motion reduction in clinical imaging



Diolch yn fawr



List of studies CW and CTMUHB

I have had an honorary contract with CTMUHB since June 2017. This supported work completed with PRIME Centre Wales and the Community Nursing Research Strategy. The honorary contract was renewed in 2020 to work with Jane O’Kane, Neonatal Service Improvement and Systems Director preconception to 1000 days. Jane has been part of the FRAIT (Family Resilience Assessment Instrument and Tool) team since 2014 when she was employed by ABMUHB. David Pontin and I are working with Jane to support service transformation using the FRAIT data and support post graduate research studies in this topic area. I have listed studies and publication/reports below demonstrating the relationship between USW and CTMUHB. Sara Thomas’ name (CTMUHB employee) highlighted in red.

Dates	Project title	Total value (£)	Source of funding	CW-CTMUHB relationship
2020	Developing an Evaluation Framework for Urgent Primary Care Pathways in Wales- CW lead	34,787.20	NHS Wales/Welsh Government	CTMUHB Evaluation framework site
2020	Evaluation of Neighbourhood Nursing pilot projects- CW lead	34,993	Welsh Government	CTMUHB Evaluation site
2020-2025	Wales Centre for Emergency and Primary Care Research (PRIME Centre Wales)-co-applicant. Including 3 years funding for Wales School for Social Prescribing Research (WSSPR). CW lead for WSSPR.	4,856,662.47 (includes 221,916 for WSSPR for 3 years)	Welsh Government	Sara Thomas co-applicant on WSSPR and member of current steering group
2019-2020	PARCHED- Prompting And encourAging Community Hydration through EDucation	97, 733	Burdett Trust	CTMUHB lead applicant. CW co-applicant and member of steering group providing Realist Review support.
2018	Group Concept Mapping & social prescribing training and education analysis	5000	NHS Wales (WEDS)	Sara Thomas co-app.
2018-2021	PhD Scholarship (21444) Cwm Taf Morgannwg UHB (21438)	77,069	EU KESS 2 CW DoS	

				Tom Roberts student.
2019 Crea	ing sustainable community assets/social capital within the context of social prescribing	20,000 HCRW	Pathway to Portfolio. CTMUHB	CW, Sara Thomas lead applicants
2018-19 A	l Wales Social Prescribing Research Network: co-applicant (CW lead)	10,000 Wales School	for Social Care Research-small grant fund	Sara Thomas co-applicant
2017-18 N	ES Welsh Community Care Information System (WCCIS) - A Realistic Evaluation study: CW lead applicant	26,575 EU KESS 2 and	NWIS	CTMUHB site of enquiry
2016-18 E	valuation of Age Related Macular Degeneration Primary Care Pilot schemes-co-applicant	108,000 Welsh	Government	CTMUHB site of enquiry

Reports and publications with Sara Thomas 2018-2020.

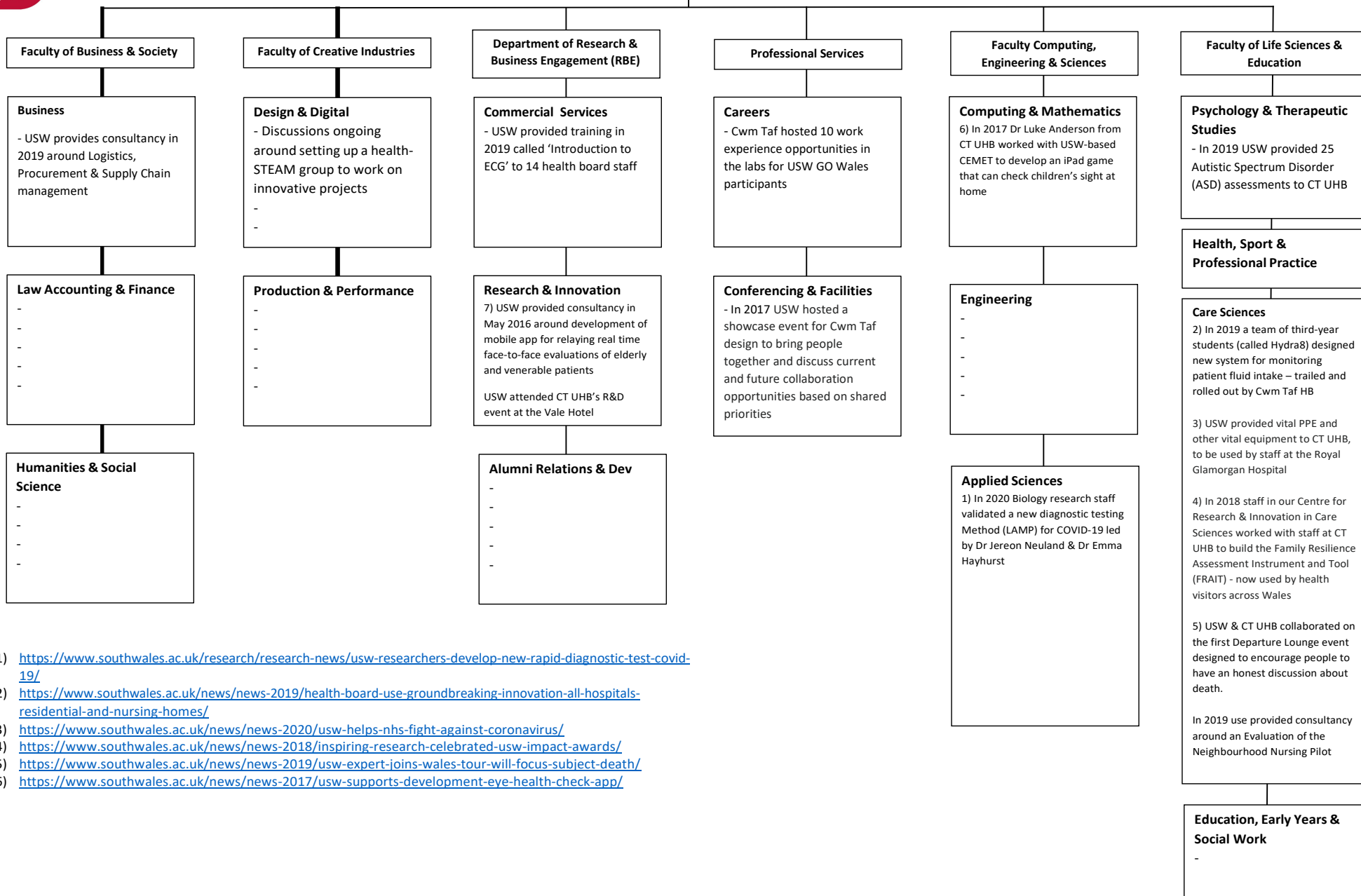
Wallace, C., Elliott, M., **Thomas, S.**, Davies-McIntosh, E., Beese, S., Roberts, G., Ruddle, N., Groves, K., Rees, S., Pontin, D., (2020) Using consensus methods to develop a Social Prescribing Learning Needs Framework for practitioners in Wales. Perspectives in Public Health. RSH-19-0186.R1
<https://doi.org/10.1177/1757913919897946>

Wallace, C., Elliott, M., **Thomas, S.**, Roberts, G., Ruddle, N., Groves, K., Rees, S., Pontin, D., (2019) Social Prescribing Learning Needs for Education and Training in Wales. Final Report 26/04/19. University of South Wales, p29.

Rees, S., **Thomas, S.**, Wallace, C (2019) Creating sustainable community assets/social capital within the context of social prescribing: Findings from the workshop held 17/07/2019. Health and Care Research Wales Pathway to Portfolio funded project. Cwm Taf Morgannwg University Health Board.

Wallace, C., Stone, J., Beeckman, L., Davies, E., Davies, F., Evans, R., Griffiths, M., Kenkre, J., Llewellyn, M., Lynch, M., Pontin, D., Powell, D., Roberts, G., Smith, S., **Thomas, S.**, Vinnicombe, S., Wallace, S., Elliott, M., Rees, S., (2018) All Wales Social Prescribing Research Network. What does good look like? Setting its outcome principles and Framework for Wales. Consultation Report. October 31st. University of South Wales. PRIME Centre Wales. REC Cymru. Wales Council for Voluntary Action, p7.

Wallace, C., Stone, J., Beeckman, L., Davies, E., Davies, F., Evans, R., Griffiths, M., Kenkre, J., Llewellyn, M., Lynch, M., Pontin, D., Powell, D., Roberts, G., Smith, S., **Thomas, S.**, Vinnicombe, S., Wallace, S., Elliott, M., Rees, S., (2018) Final Report on the All Wales Social Prescribing Research Network. Setting its Research Priorities for Wales. University of South Wales. PRIME Centre Wales. REC Cymru. Wales Council for Voluntary Action, p14.



- 1) <https://www.southwales.ac.uk/research/research-news/usw-researchers-develop-new-rapid-diagnostic-test-covid-19/>
- 2) <https://www.southwales.ac.uk/news/news-2019/health-board-use-groundbreaking-innovation-all-hospitals-residential-and-nursing-homes/>
- 3) <https://www.southwales.ac.uk/news/news-2020/usw-helps-nhs-fight-against-coronavirus/>
- 4) <https://www.southwales.ac.uk/news/news-2018/inspiring-research-celebrated-usw-impact-awards/>
- 5) <https://www.southwales.ac.uk/news/news-2019/usw-expert-joins-wales-tour-will-focus-subject-death/>
- 6) <https://www.southwales.ac.uk/news/news-2017/usw-supports-development-eye-health-check-app/>

Academic Partnership – Cwm Taf Morgannwg UHB and Cardiff Metropolitan University

Professor Philip E. James
Associate Dean Research



Cardiff
Metropolitan
University

Prifysgol
Metropolitan
Caerdydd

Our Schools

- School of Sport and Health Sciences
- School of Art and Design
- School of Management
- School of Education and Social Policy
- School of Technologies
- PDR – International Centre for Design and Research



Cardiff
Metropolitan
University

Prifysgol
Metropolitan
Caerdydd

Our Campus



Cardiff
Metropolitan
University

Prifysgol
Metropolitan
Caerdydd

School of Sport and Health Sciences

- Dean – Dr Katie Thirlaway
- Deputy Dean – Dr Huw Wiltshire
- Associate Dean Innovation – Dr Peter Sykes
- Associate Dean Teaching and Learning – Dr Jake Bailey
- Associate Dean Research (Sport) – Prof Robyn Jones
- Associate Dean Research (Health) – Prof Philip James
- Associate Dean Partnerships – Dr Daniel Hegg



Our Undergraduate Programmes

FdSc Dental Technology
Foundation Leading to BSc in Health Sciences
Foundation Leading to BSc/BA in Social Sciences
BSc (Hons) Biomedical Science
BSc (Hons) Biomedical Sciences with Health, Exercise & Nutrition
BSc (Hons) Complementary Healthcare (with Practitioner Status)
BSc (Hons) Dental Technology
BSc (Hons) Environmental Health
BSc (Hons) Food Science and Technology
BSc (Hons) Healthcare Science
BSc (Hons) Human Nutrition and Dietetics
BSc (Hons) Nutrition
BSc (Hons) Podiatry
BSc (Hons) Psychology
BSc (Hons) Speech and Language Therapy

Intercalated BSc (Hons) Sport and Exercise Science
BSc (Anrh) Astudiaethau Chwaraeon ac Addysg Gorfforol Dwyieithog
BSc (Hons) Sport and Exercise Science
BSc (Hons) Sport and Physical Education
BSc (Hons) Sport and Physical Education (Dance)
BSc (Hons) Sport Coaching
BSc (Hons) Sport Conditioning, Rehabilitation and Massage
BSc (Hons) Sport Management
BSc (Hons) Sport Media
BSc (Hons) Sport Performance Analysis
BSc (Hons) Sport Studies
BSc (Hons) Sport, Physical Education and Health
BSc (Hons) Sport, Physical Education and Health (Dance)
BSc Sport and Exercise Science
BSc Sport Coaching

Total Students (HESA) – 4,202

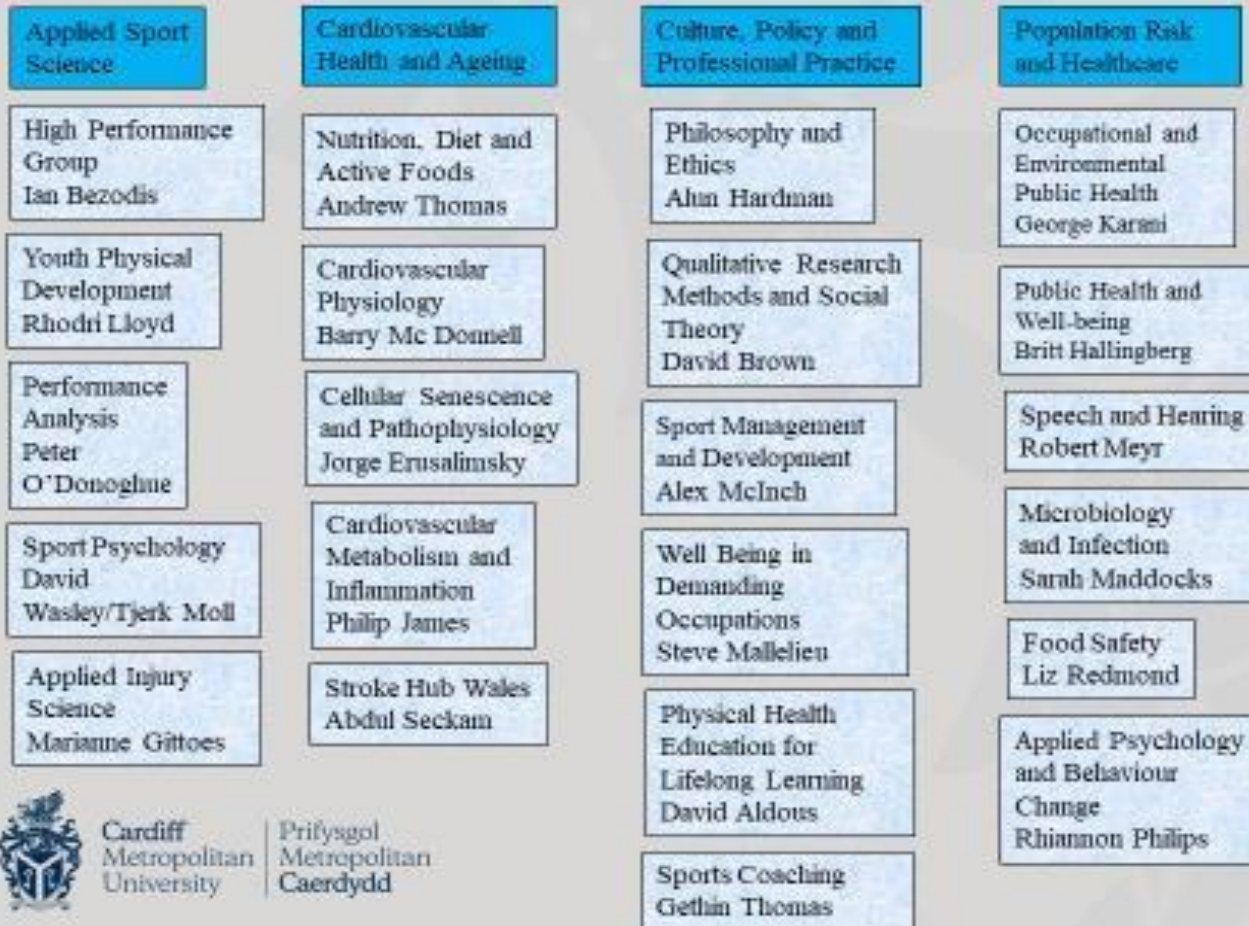
•UGT – 3,327



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Research and Innovation



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- Annual R&I income ~ £4 million
- Annual publication (peer reviewed 3* and 4*) – 130
- PGR FT – 58
- PGR PT -98
- 33 staff undertaking PhD/Prof Doc



What does partnership with CTMUHB bring to us?

- Student Placements
- Honorary Appointments
- Specialist Lecturing/Teaching
- R&I projects
- Clinical Cohorts
- Impact
- Innovation



What hasn't gone well?

- Sharing strategic priorities
- Coordinated interaction
- Limited interaction with other Schools



Dr Katie Thirlaway – Dean, CSSHS

Our Vision

- We will be known globally for our employability-focused education and impactful research.
- We will create a School where world leading academics want to work, and where we are the first choice for students.
- We will be the preferred provider to our stakeholders because of our effective partnerships with other academics, our industries and our local community groups.



Our Vision (continued)

- We will work in and with our local community to improve the wellbeing of future generations through inclusive education, opening our campuses to the local community to engage in a range of student-led services.
- We will work in partnership with our University Health Board partners across Wales to deliver consistent high quality health care education and improve the health care services of Wales.

Dr Peter Sykes – Associate Dean Innovation

University innovation, also termed *Knowledge Transferor Knowledge Exchange*, encompasses all activities where staff share their knowledge and expertise with businesses, the public and other organisations. This can result in social and cultural impacts, as well as economic benefits.

Activities Include:

- Consultancy and/or advisory work (including tenders)
- Collaborative research* with a company
- Creation of and exploitation of IP
- Creating student placements
- Work based learning / continuing professional development
- Spin-outs / Spin-ins
- Short courses
- Strong focus on civic mission and collaborative working



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External Sources of Competitive Funding

UKRI

Trusts (NHS or Wellcome Trust)

Charities (133 medical research charities spending £1.3bn annually)

Innovate UK

Welsh Government (H&C Research Wales/ SMART)

Knowledge Transfer Partnerships (KTP)

MSCA fellowships

Travel Grants (Daiwa Foundation, Newton Fund)

Consultancy Contracts

Tendering

Innovation Activity and future plans

Some excellent work underway.

- Opportunistic Atrial Fibrillation screening , diabetes screening (Jane Lewis)
- Chronic wound rapid testing (Sarah Maddocks)
- Novel exercise equipment design for rehabilitation of newly injured individuals (spinal injury and/or stroke) (Paul Smith)
- Whole systems approach to childhood obesity in Cwm Taf Morgannwg (Diane Crone)

Strong industry links

Strong innovation focus through existing Centres-FIC,CHSE, CHAWR

Strategic direction

- Supporting growth in innovation activity (pump-priming)
- Improve external engagement
- Exploit synergies-health and sport focusing on innovation
- Expand dedicated R&I centres
- Target Knowledge Transfer activities.
- Commercialise existing facilities
- Grow CPD and short courses

Dr Robyn Jones – Associate Dean Research (Sport)

- A focus on 'Sport'?
- Also;
- 'Exercise', 'Health', 'Rehabilitation' and 'Well being'



R&I Groups

- 'Applied injury science'
- 'Youth physical development' [YPD]
- 'Physical education and life long learning' [PHELL]

Themes from 'Sport injury group'

- 'Prediction of injury occurrence'
- 'Response to, and recovery from, injury'
- 'Injury rehabilitation and return-to-sport'

Current work

- UEFA funded project – ‘Mental health within football’ (Drs. Charlie Corsby & Andy Lane)
- Work with Stoke Mandeville Research Group – Dr. Paul Smith
- An agenda of integration [Health = Sport]

Exemplars



Stroke Hub Wales Hwb Strôc Cymru

Stroke Hub Wales Hwb Strôc

Follow Stroke Hub Wales on Twitter

Bringing care,

Contact



Stroke Hub Wales/Stroke Association Public and Patient Involvement Committee

On the 14th of March 2019, Stroke Hub Wales (SHW) in collaboration with the SA (Bridgend County Life after Stroke Support Group) set up the SHW/SA PPI Committee. This committee will serve as a resource providing PPI reports and coproduce research studies together with our Stroke clinicians, Allied Health Professionals (AHPs) and researchers in Wales.

The governance framework will consist of a chair (Mrs Karyl Carter) a coordinator (Dr Abdul Seckam), a core (clinician, AHP, stroke survivor, stroke carer and a member of the public) and SHW/SA PPI members. The group will meet on a quarterly basis and as and when projects arise. SHW/SA PPI committee have already consulted on three projects at the launch and have several projects in the pipeline.

We look forward to serving our Welsh clinicians, AHPs and researchers in advancing the stroke research and innovation agenda in Wales. To access the SHW/SA PPI committee for funding applications and/or coproduction, please contact Dr Abdul Seckam (SHW Manager) at aseckam@cardiffmet.ac.uk

Welcome to

Advances in stroke research
ultimate aim of research
affected by stroke

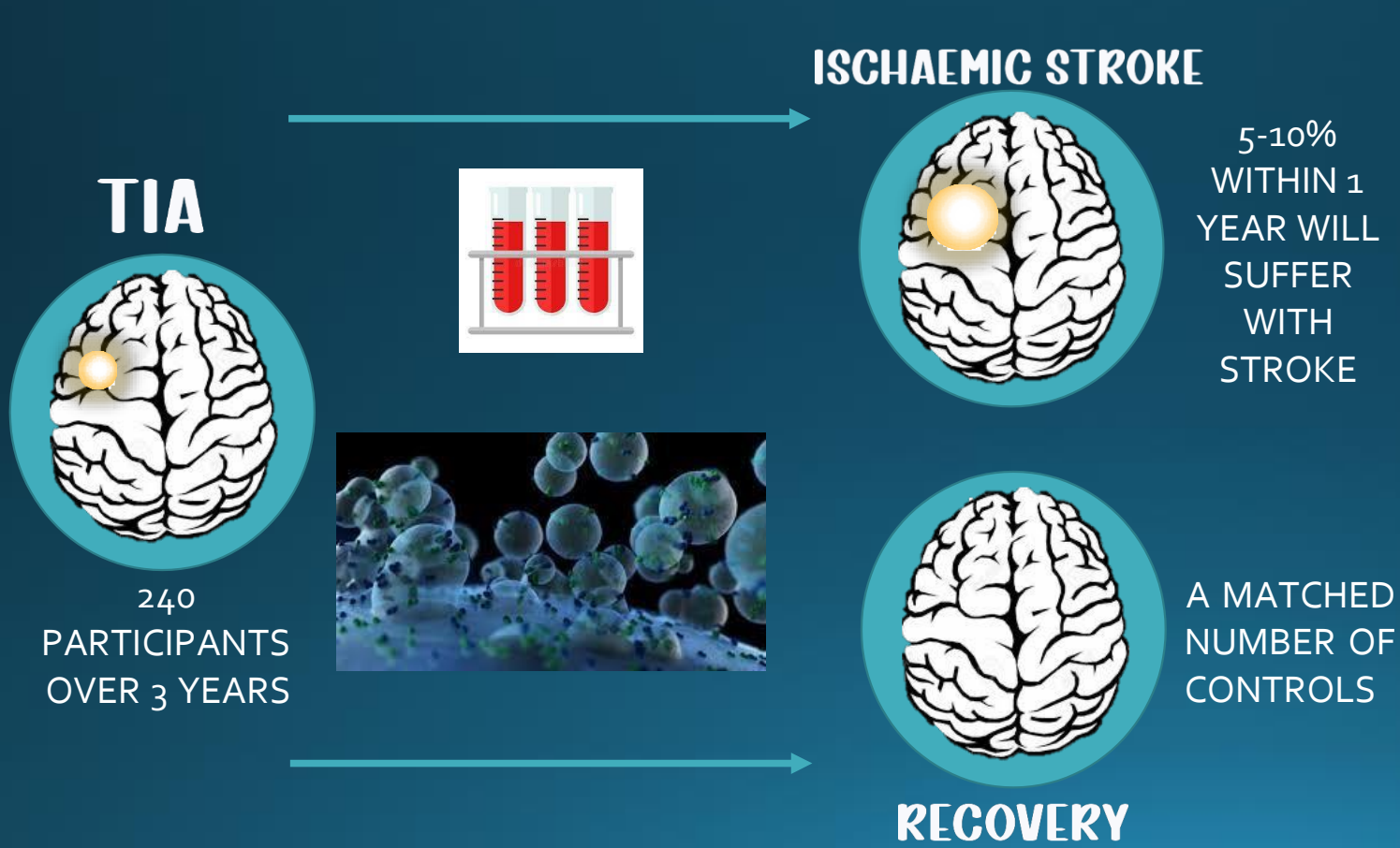


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PREDICT-EV

USING CHARACTERISATION OF EXTRACELLULAR VESICLES AS A PREDICTOR IN STROKE



- COLLABERATION BETWEEN PROF PHIL JAMES, DR JESS WILLIAMS (CMET) & DR JAMES WHITE (CLINICAL STROKE LEAD CTMUHB), PROF JOHN GEEN (PATH LEAD CTMUHB)
- ★ IRAS SUBMITTED, NHS REC APPROVAL PENDING
 - ★ FUNDED BY WELSH GOVERNMENT PATHWAY TO PORTFOLIO
 - ★ FORMING BASIS OF SIG AND BHF PROJECT GRANTS

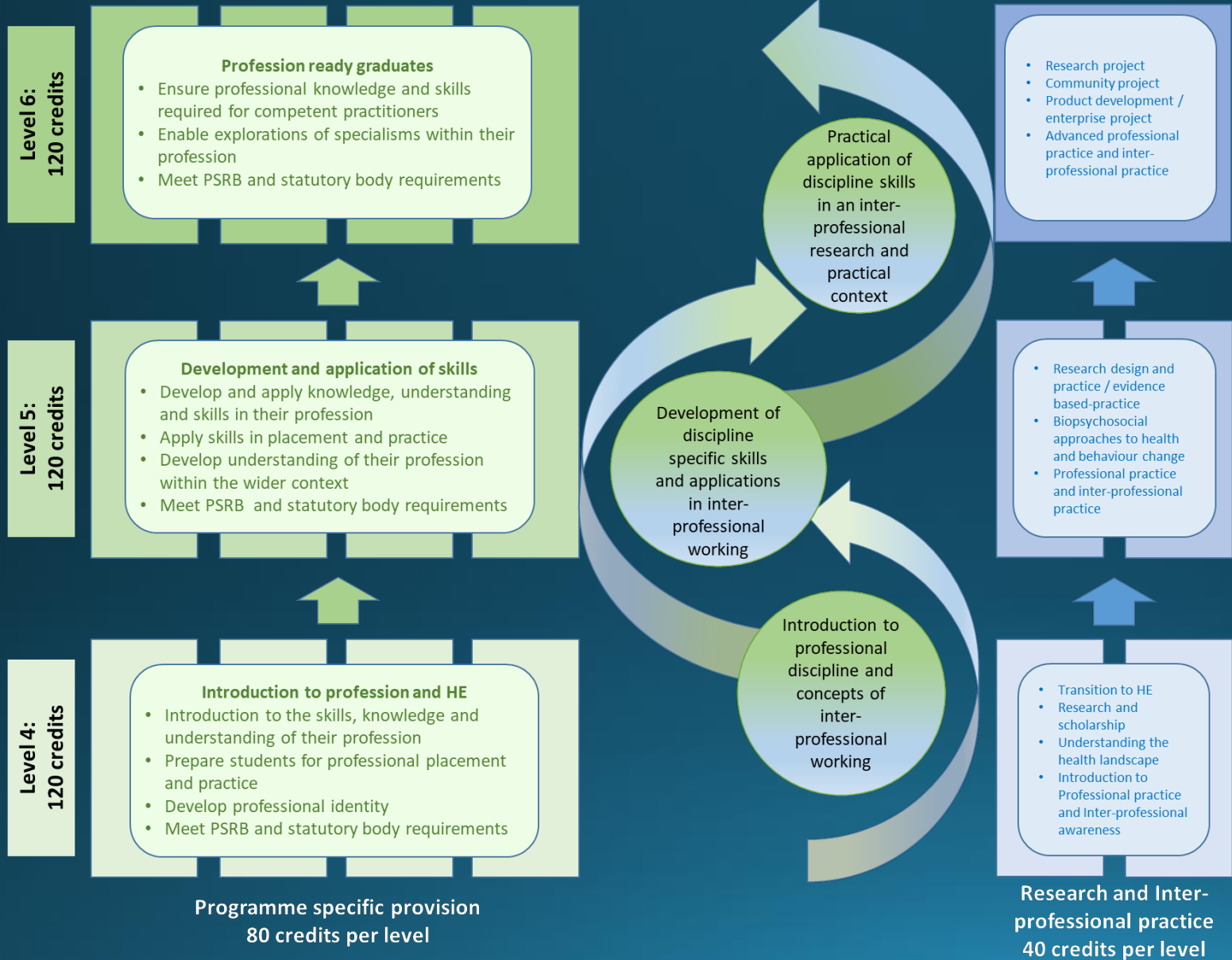
Jake Bailey

Associate Dean Student Engagement

- Established placement opportunities
- For example, currently the following placements are underway:

BSc (Hons) Health Care Sciences	BSc (Hons) Speech and Language Therapy	BSc (Hons) Human Nutrition and Dietetics
12 x HCS students <u>Royal Glamorgan + Prince Charles</u> Blood Sciences: 1 xL4, 1xL5, 3xL6 <u>Royal Glamorgan</u> Cellular Sciences: 1xL4, 1xL5, 1xL6 Infection Sciences: 1 xL4, 1xL5, 2xL6	8 x Level 6 Speech and language Therapy students	7 x Level 6 Human Nutrition and Dietetics students








Continued collaboration for further professional development

Requires collaboration throughout to develop professional ready graduates

Curriculum framework for Cardiff Met HEIW commissioned programmes

Employability Development Menu

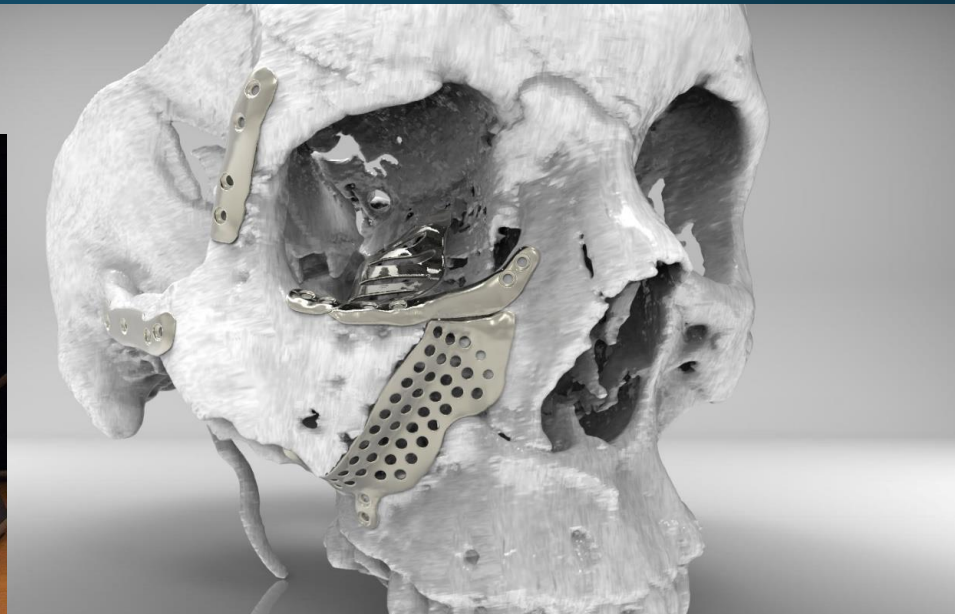
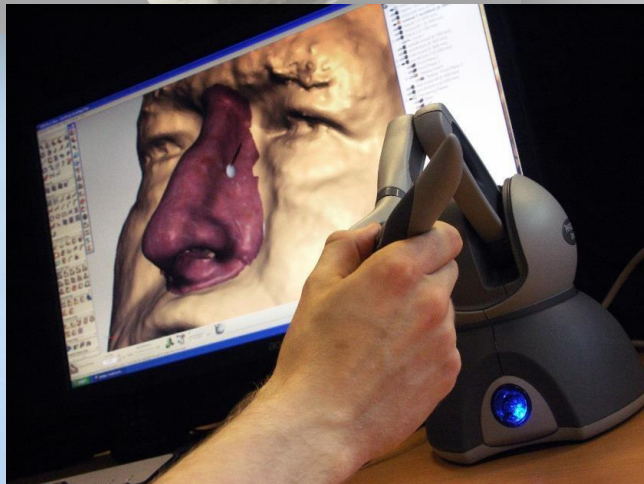
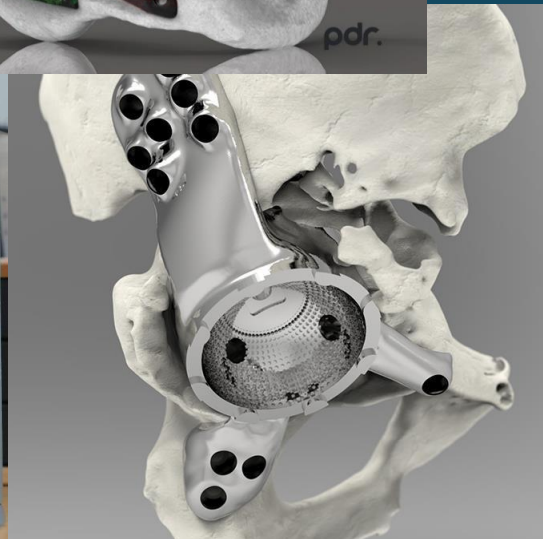
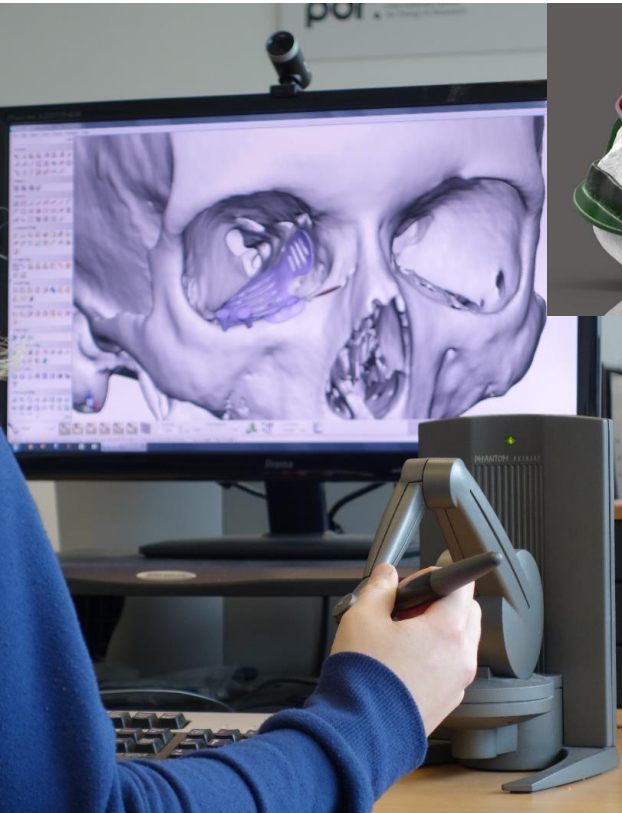
(Osborne & Lewis, 2021 pending)

	Institution 	Digital 	Workplace 
Work Based & Placement	<ul style="list-style-type: none"> University Sponsored Placements & Internships Extended Consultancy Projects Vicarious Learning –Shadowing Campus Staff Volunteering & Paid Employment Supervision and Mentoring on campus staff 	<ul style="list-style-type: none"> Virtual Placements & Internships Extended Consultancy Projects Digital Vicarious Learning –Shadowing Business Virtual Volunteering & Paid Employment Virtual Supervision and Mentoring 	<ul style="list-style-type: none"> Workplace Placements & Internships Extended Consultancy Projects Vicarious Learning –Shadowing Business Volunteering & Paid Employment Workplace Supervision and Mentoring
Work Related Learning	<ul style="list-style-type: none"> Professional Development Modules Campus Based Scenario and Simulation Training Competency and Proficiency Tasks Project and problem-based learning Employer Insights (Sync/Async) Guest Lectures Resource Utilisation–Integrate activities into seminar learning Case Study Learning Enquiry Based Learning Service Based Learning Capstone Project Campus based conferences Seminars 	<ul style="list-style-type: none"> Digital/ VR Scenario and Simulation Training Digital/VR Competency and Proficiency Tasks Project and problem-based learning collaborative spaces Employer Insights (Sync/Async) Webinars/ Podcasts Employer Insights –Digital/VR Site Visits Digital/ Multi-media Case Study Learning Digital Enquiry Based Learning Service Based Learning Capstone Project Industry Digital Conferences/ Seminars 	<ul style="list-style-type: none"> Learning Module Delivery in-situ Work Based Scenario and Simulation Training Competency and Proficiency Tasks Project and problem-based learning Employer Insights Site Visits & Employer Briefs On site Live Case Study Learning Field Work Service Based Learning Capstone Project Industry Conferences /Seminars
Enterprise Education	<ul style="list-style-type: none"> Enterprise Education Learning Modules Entrepreneurship Education Learning Modules/Projects Module –Problem Based Learning Business start up support Events & out of curriculum seminars/workshops 	<ul style="list-style-type: none"> Enterprise Education Learning Modules Entrepreneurship Education Learning Modules/Projects Digital Open Innovation Projects Digital Business Start up support Digital Communities Events & out of curriculum seminars/workshops 	<ul style="list-style-type: none"> Business Accelerators Business Incubators Events & Sector Specific seminars/workshops
Career Development	<ul style="list-style-type: none"> Professional Development Modules Career Development Management –Career Adaptability Career Development workshops and events Sector Awareness 	<ul style="list-style-type: none"> Online Professional Development Modules Career Development theory –Career Adaptability Career Development digital workshops and online events Sector Awareness 	<ul style="list-style-type: none"> External Support Services PSRB Support & Events Employer Onboarding , Induction & Appraisal Sector Awareness
Knowledge Development	<ul style="list-style-type: none"> Curriculum Development & Understanding PSRB Constructive Alignment Research Informed Curriculum Development Conceptual and Procedural 	<ul style="list-style-type: none"> Curriculum Development & Understanding PSRB Constructive Alignment Research Informed Curriculum Development Conceptual and Procedural 	<ul style="list-style-type: none"> PSRB Led insights Industry Led Insights Employer Led Insights Procedural
Skills Development	<ul style="list-style-type: none"> Seminar & Assessment Frameworks Extra curricular (Sport / Volunteering/ Awards) 	<ul style="list-style-type: none"> Seminar & Assessment Frameworks Extra curricular (Sport / Volunteering / Awards) 	<ul style="list-style-type: none"> PSRB Led Training & Development Industry Led Training & Development Employer Led Training & Development
Life-Long Learning	<ul style="list-style-type: none"> Communication Basic competences in science and technology Digital competence Learning to learn Social and civic competences Sense of initiative and entrepreneurship Cultural awareness and expression 	<ul style="list-style-type: none"> Communication Basic competences in science and technology Digital competence Learning to learn Social and civic competences Sense of initiative and entrepreneurship Cultural awareness and expression 	<ul style="list-style-type: none"> PSRB Led Training & Development Industry Led Training & Development Employer Led Training & Development

Prof Dominic Eggbeer - PDR

- We've been using 3d design and manufacturing technologies for nearly 20 years.
- Together with colleagues in Dental Technology and in NHS Wales, we've pioneered the introduction of this tech. into routine care.
- Cwm Taf Morgannwg UHB have just started their digital lab with extensive 3d design and manufacturing capability.
- We must now support the efficient development of this, including a quality management system.
- This has broad application to surgical specialities and allied healthcare specialists.





Questions...



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Other attendees

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