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Executive Summary

Research and Innovation in BCHC continues to grow satisfactorily.

We have begun the shift from externally defined research to research generated within and with direct relevance to BCHC patients. The impact of this can be seen in the Outcomes and Impacts of Research section of the report. We anticipate this shift to accelerate in the coming years.

We have again significantly over-performed on our national recruitment target (270% over) and again are the top recruiting Community Healthcare Trust in the country.

Our performance against the NIHR Higher Level Objectives continues to be good, although notable is the lack of commercial research which will be a priority for the coming year.

The outcome of funding applications made in, or resolved in this year is mainly positive with 5 of the 9 bids being successful (income £162,262) and one bid (£1,215,723) being successful at the first stage, now going forward to the final stage. Whilst these 5 bids, for additional infrastructure staffing (from NIHR,) are to be welcomed it remains a concern that we were not successful in the other two major research grant bids as it is these bids that result in future revenue income. Coupled with a reduction in research income for the coming year it is clear that a significant priority for the future will be stimulating and developing portfolio grant applications. This programme has been started and we will see the developments in next year’s report.

We continue to build the research infrastructure within the Trust by promoting and supporting training and mentoring which includes the clinical academic programmes at the University of Birmingham and in anticipation for future research growth we are maturing the Community Healthcare Research Alliance across England.

We continue to work closely with the West Midlands Clinical Research Network and were pleased to receive from them “BCHC, Highly Commended – Best Overall Performance Award 2017”. We also received an award for our contribution to research in the area of older adults.

Our Innovation has turned a significant corner this year. A “Virtual Innovation Forum (VIF)” has been established to capture ideas and contributions from our staff. As well as supporting innovations in specific clinical areas (see the Innovation section of the report for details) we have been focussing on what we describe as ‘game changing’ innovations. That is to say; innovations that have the potential to fundamentally change (improve) the way in which BCHC delivers its clinical service. To this end an NHS England Test Bed “Multidisciplinary Therapy Hub with Virtual Clinics” Expression of Interest was submitted and has been taken forward to full application. We await the outcome in the current financial year.

Our main challenges for the coming year are financial sustainability and engagement with commercial research. We need to be building our Research Capability Funding income so we will be focussing our efforts on identifying areas of research need for our patient population and supporting potential researchers in pursuit of quality grant applications. On the commercial side, we continue to work closely with WMCRN to identify suitable commercial research opportunities and we anticipate that our present discussions with Commercial Research Organisations will see new partnership arrangements leading to a Birmingham based Commercial Research Facility established in 2018/19.
# Outcomes and Impacts of Research

## Outcomes

<table>
<thead>
<tr>
<th>Researchers Details and Division</th>
<th>Title</th>
<th>Research Outline</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Dr Beryl Oppenheim (Consultant Microbiologist) Urgent Care | Reducing misdiagnosis of urinary tract infection in the elderly | The study is looking to reduce the misdiagnosis and antibiotic prescribing practices of the diagnosis, management and treatment of urinary tract infection in older people. | • Urine dipstick testing for older adults is driven by routine admission procedures or undocumented reasons (70.5% of all cases).  
• The study highlights conflicting and unclear diagnostic pathways for UTI that likely contribute to over-diagnosis. Urine tests are implemented routinely, rather than being used to confirm signs and symptoms of a UTI. In this patient group of elderly adults, routine dipstick testing and a reliance on urine microbiology may be unhelpful in guiding diagnostic decision-making which requires good clinical assessments.  
• Nurses have a crucial role in diagnosis and would benefit from education about not treating asymptomatic bacteriuria (ASB) in the elderly  
• Doctors often aware of overdiagnosis and recommendations but keep treating ASB, as they have no alternative understanding of bacteria other than harmful  
• Older patients may be repeatedly diagnosed with UTIs and treated with antibiotics in a complex health situation.  
• The next phase of research has been completed and results |
<table>
<thead>
<tr>
<th>Researchers Details and Division</th>
<th>Title</th>
<th>Research Outline</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Dr Beryl Oppenheim (Consultant Microbiologist) Urgent Care | Prevalence asymptomatic carriage of Clostridium difficile in Birmingham Community Healthcare in-patients in community units | ^ To investigate the prevalence of asymptomatic C. difficile carriage and investigate if asymptptomatically carried C. difficile strains contribute to infections generated in hospital. | • Several other studies indicated that Clostridium difficile contamination was identified on the surface of the skin in the abdominal area, this was not the case with the BCHC study. This finding is most likely attributed to good general nursing care where the abdominal site is regularly cleaned.  
• Further detailed findings have been submitted to a journal and cannot be presented until the publication has been accepted and published. |
| Carol Owens Job title) & Sarahjane Jones (academic researcher) Urgent Care | A pilot investigation into frequent fallers' experiences of an adapted walking frame, designed to reduce the walking aids's associated falls risk | ^ Developing the 'step right buddy' to encourage patients to use their walking aids correctly | • This small pilot (20) gained insight into the user’s experience of trialling the device.  
• The study was used to highlight any other possible risks or hazards that may be introduced using it.  
• The findings report very positive experiences and there are plans to apply for funding to conduct a larger trial. |
| Paul McArdle (Dietician) Urgent Care | CAADDi – Carbohydrate Awareness Advice by Dieticians in Diabetes | ^ Looked at the quality of advice people with Type 2 diabetes receive about carbohydrates | • Patients were generally very positive about their experience and the dietician  
• Patients have a sugar-centric recollection of the advice  
• Patients lack confidence in their understanding of carbohydrate  
• Patients want advice to be more practical, more culturally appropriate and more individualised /
<table>
<thead>
<tr>
<th>Researchers Details and Division</th>
<th>Title</th>
<th>Research Outline</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Marilyn Poole (Physiotherapist) C&F | Perspectives of children with neurodisabilities, their carers and therapists on use of walkers and modifying them to promote physical activity. (PLAY STUDY) | ^This study explored the experience of walker use from children with neurodisabilities, their parents and therapists. | • Child centred individual clinical assessment is therefore important to discuss specific needs and goals.  
• To maximise walker use and promote physical activity, prescribers and designers might need to prioritise the key motivations of walker users and parents, and place less emphasis on therapy goals when decision making.  
• Designers of walking aids should prioritise improved manoeuvrability, safety, ease of outdoor use and comfort above addition of technology to promote physical activity. |
<p>| Kumar Nag (Cultural Support Officer) Urgent Care | Caregiving Hope | Explored the key factors that impact the wellbeing of a carer for a person with dementia at | • Greater preparedness in caregivers was associated with reduced burden, anxiety and depression. |</p>
<table>
<thead>
<tr>
<th>Researchers Details and Division</th>
<th>Title</th>
<th>Research Outline</th>
<th>Findings</th>
</tr>
</thead>
</table>
| **Collaborations: Bradford Uni** | Drooling Reduction Intervention randomised trial | This was a multicentre, single-blind, randomised controlled Trial to investigate whether hyoscine patch or glycopyrronium liquid is more effective and acceptable to treat drooling in children with neurodisability. | • Hyoscine and glycopyrronium are clinically effective in treating drooling in children with neurodisability.  
• Hyoscine produced more problematic side effects leading to a greater chance of treatment cessation.  
• Where either medication might be used, glycopyrronium should be the medication of first choice—the opposite situation to current UK prescribing practice. |
| **Neil McCathie (Paediatrician)** | Sealants for children having decayed teeth extracted under GA | This study randomised children to observe the effect of a sealant on teeth | • 35% of children in the control-group presented with dentine caries in at least one permanent molar, compared with 5.1% in the sealant-group.  
• At 2 years, sealants were still fully or partially |

**Miss Abida Raja (Dentist)**
**Dental Service**
<table>
<thead>
<tr>
<th>Researchers Details and Division</th>
<th>Title</th>
<th>Research Outline</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Christine Singleton (Physiotherapist) Rehab Specialist Service | The efficacy of functional electrical stimulation of the abdominal muscles in the treatment of chronic constipation in patients with multiple sclerosis - a pilot study | Multiple sclerosis patients commonly complain of having chronic constipation. This study used Functional electrical stimulation on the abdominal muscles to observe the effect on the management of constipation. | • The patients’ use of laxatives was reduced.  
• No adverse effects of FES treatment were reported.  
• The findings of this pilot study suggest that FES applied to the abdominal muscles may be an effective treatment modality for severe chronic constipation in patients with MS  
• An NIHR Research for Patient Benefit (RfPB) bid has been submitted for a larger two-centred trial. |

^ Studies sponsored by BCHC  
* The Sponsor takes on responsibility for initiation, management and financing (or arranging the financing) of the research.

**Impact and Benefits:**
These studies reflect the first stage of BCHC designed, implemented and sponsored* studies. The benefits of this work will be reflected in the rising levels of posters, presentations and publications within each service and a gradual increase in significant research outcomes relevant to BCHC that will ultimately improve the healthcare of patients. The impact of this work from an internal perspective is that active researchers become empowered to use their research skills to identify new research questions relevant to their service which leads to a process of continuous improvement. The impact of this work from an external perspective is that it will raise the profile of the Trust as a research active institution which will attract collaborations and offers of new research.


## Research Performance against National Targets

### Recruitment

5348 Activity Based Funding\(^1\) units was secured by 22 studies

1019 patients recruited against target of 364 (279 % over)

### Higher Level Objectives:

<table>
<thead>
<tr>
<th>Higher level objectives (applied to Birmingham Community Healthcare NHS Foundation Trust )</th>
<th>Total studies measured</th>
<th>Achieved?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To recruit 364 participants between 1st April 2016 and 31st March 2018</td>
<td>24</td>
<td>✓ (1019)</td>
</tr>
<tr>
<td>2. To recruit to target and to time</td>
<td>8</td>
<td>✓</td>
</tr>
<tr>
<td>3. To host commercial studies</td>
<td>0</td>
<td>× No suitable commercial studies were available.</td>
</tr>
<tr>
<td>4. To Confirm Capability and Capacity within 40 calendar days</td>
<td>11</td>
<td>✓</td>
</tr>
</tbody>
</table>
| 5. To recruit the first participant within 30 calendar days | 9 | 8 achieved
1 not achieved
(involved taking consent from very recently bereaved parents/guardians.) |

### Performance in Initiating and delivering Clinical Research

<table>
<thead>
<tr>
<th>Performance in Initiating and Delivering Clinical Research Measure(^2)</th>
<th>Total studies measured</th>
<th>Achieved?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Initiating Clinical Research within 70 calendar days</td>
<td>3</td>
<td>✓</td>
</tr>
<tr>
<td>2. Delivering Commercial Clinical Research to time and target</td>
<td>0</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

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1 Activity Based Funding - This is an allocation provided to the Trust by the NIHR CRN West Midlands to support the development of the Trust’s research infrastructure. The funding applies to NIHR Portfolio studies. The funding is calculated by applying a unit value to each participant recruited. Each unit will vary depending on the study Banding. ABF bands and unit: Band 1 Studies (i.e. online questionnaires) = 1 unit, Band 2 Studies (i.e. observational studies) = 3.5 units and Band 3 Studies (i.e. interventional) = 11 units.

2 Performance in Initiating and Delivering Clinical Research Measure - The Department of Health has set 2 performance targets for studies defined as clinical research (studies that involve a clinical intervention). (1) Initiating Clinical Research: This measures the time taken to recruit the first patient. The benchmark is set at 70 calendar days. (2) Delivering Clinical Research: This measures whether the research team recruited the target number of participants on time and to target. This measure applies to research sponsored by commercial companies.
## Finance

### Income

<table>
<thead>
<tr>
<th>Trust Funded Posts</th>
<th>£80,000</th>
<th>Research Capability Funding&lt;sup&gt;3&lt;/sup&gt;</th>
<th>£256,712</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity Based Funding</td>
<td>£125,815</td>
<td>Commercial</td>
<td>£42,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£504,527</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Outcome of funding applications made in 2016/17

<table>
<thead>
<tr>
<th>Bid Title</th>
<th>Lead Researcher</th>
<th>Funding Body</th>
<th>Budget</th>
<th>Bid Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of a patient-centred goal-setting process for rehabilitation of patients with stroke: A feasibility study to explore application and evaluate methodology for a further study.</td>
<td>Carron Sintler (BCHC staff) and Sheba Rosewilliams (University Hospital Birmingham NHS Foundation Trust)</td>
<td>National Institute for Health Research, Research for Patient Benefit</td>
<td>£225,049</td>
<td>Not successful. The bid will be re-submitted in 2018</td>
</tr>
<tr>
<td>Diabetes outcome measurement, improvement and knowledge mobilisation</td>
<td>Ryan Irwin (University of Birmingham)</td>
<td>National Institute for Health Research, Research for Patient Benefit</td>
<td>£221,000</td>
<td>Not Successful</td>
</tr>
<tr>
<td>Strategic Funding for clinical academic research 1 year only</td>
<td>University of Bham &amp; BCHC staff</td>
<td>*Clinical Research Network: West Midlands</td>
<td>£43,333</td>
<td>Bid Successful</td>
</tr>
<tr>
<td>Strategic funding for joint research nurse with Black Country Partnership NHS Foundation Trust* and Dudley &amp; Walsall Mental Health Partnership Trust* 1 year only Speciality mental health</td>
<td>Esther Hutchings Research Nurse</td>
<td>*Clinical Research Network: West Midlands</td>
<td>£37,768</td>
<td>Bid successful Funding allocated to Black Country Partnership NHS Foundation Trust where nurse was based</td>
</tr>
</tbody>
</table>

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<sup>3</sup> Research Capability Funding - this is provided by the NIHR to help research-active NHS organisations to act flexibly and strategically to maintain research capacity and capability, support the appointment, development and retention of key staff and undertake or support people and patient based research.
### Bid Title

**0.5 WTE (Whole Time Equivalent) backfill for MSK (Musculoskeletal) physiotherapist to manage two portfolio research projects 1 year only**

- **Lead Researcher:** Jonathan Price
- **Funding Body:** *Clinical Research Network: West Midlands*
- **Budget:** £20,014
- **Bid Outcome:** Initially not successful but after 6 months the funds were offered and accepted by BCHC

### Bid Title

**Research Nurse 1 year only**

- **Lead Researcher:** Claire Williams
- **Funding Body:** *Clinical Research Network: West Midlands*
- **Budget:** £23,289
- **Bid Outcome:** Initially not successful but after 6 months the funds were offered and accepted by BCHC

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**Funding applications made in 2017/18**

<table>
<thead>
<tr>
<th>Bid Title</th>
<th>Lead Researcher</th>
<th>Funding Body</th>
<th>Budget</th>
<th>Bid Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic funding for joint research nurse with Black County Partnership NHS Foundation Trust* and Dudley &amp; Walsall Mental Health Partnership Trust* 1 year only Speciality mental health</td>
<td>Esther Hutchings, Research Nurse</td>
<td><em>Clinical Research Network: West Midlands</em></td>
<td>£37,768</td>
<td>Bid successful Funding allocated to Black County Partnership NHS Foundation Trust where nurse was based</td>
</tr>
<tr>
<td><strong>0.5 WTE backfill for MSK physiotherapist to manage two portfolio research projects 1 year only</strong></td>
<td>Jonathan Price, Physiotherapist</td>
<td><em>Clinical Research Network: West Midlands</em></td>
<td>£20,014</td>
<td>Bid successful</td>
</tr>
<tr>
<td><strong>Research Nurse 1 year only</strong></td>
<td>Claire Williams, Research Nurse</td>
<td><em>Clinical Research Network: West Midlands</em></td>
<td>£23,289</td>
<td>Not successful</td>
</tr>
<tr>
<td><strong>Eye movement desensitisation and reprocessing for symptoms of post-traumatic stress disorder in adults with Learning disabilities</strong></td>
<td>Professor Paul Willner, Swansea University &amp; Sara Willott, BCHC (Learning Disabilities)</td>
<td>Health Technology Assessment</td>
<td>£1,215,723.0</td>
<td>Successfully past stage 1</td>
</tr>
<tr>
<td><strong>Christine Singleton, Clinical Specialist, Service Lead (BCHC Staff) and Project Manager for Rehab</strong></td>
<td>'Feasibility study to inform the design of a Randomised Control Trial to assess the effectiveness of National Institute for Health Research, Research for Patient</td>
<td></td>
<td>£247,127.00</td>
<td>Bid unsuccessful Will re-submit Nov 2018</td>
</tr>
<tr>
<td>Bid Title</td>
<td>Lead Researcher</td>
<td>Funding Body</td>
<td>Budget</td>
<td>Bid Outcome</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Functional Electrical Stimulation for management of Constipation associated with Multiple Sclerosis (FESCaMS)'</td>
<td>Benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and Innovation Team Research Support Officer post to support the portfolio research manager</td>
<td>* Clinical Research Network: West Midlands Annual Strategic Funding</td>
<td>£42,204</td>
<td>Not successful</td>
<td></td>
</tr>
</tbody>
</table>
### New Studies Opened during 2017/18

#### Studies adopted onto the National Institute for Health Research Portfolio

<table>
<thead>
<tr>
<th>Study</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GRASP</strong>: Getting it Right: Addressing Shoulder Pain. Clinical and cost effectiveness of progressive exercise compared to best practice advice, with or without corticosteroid injection, for the treatment of rotator cuff disorders: a 2x2 factorial randomised controlled trial.</td>
<td></td>
</tr>
<tr>
<td><strong>PLAY</strong>: Perspectives of walking aid users, their carers and therapists on designing walkers that encourage children with neurodisabilities to be more physically active.</td>
<td></td>
</tr>
<tr>
<td><strong>ALPHABET</strong>: Screening of Chronic Inflammatory conditions in General dental practice (SUCceSS) Phase 3</td>
<td></td>
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<tr>
<td><strong>HSP</strong>: UK register for hereditary spastic paraplegia</td>
<td></td>
</tr>
<tr>
<td><strong>PD COMM</strong>: A multi-centre randomised controlled trial to compare the clinical and cost effectiveness of Lee Silverman Voice Treatment versus standard NHS speech and language therapy versus control in Parkinson's disease</td>
<td></td>
</tr>
<tr>
<td><strong>SEED</strong>: Supporting Excellence in End of life care in Dementia via individual care plans: Workstream 6</td>
<td></td>
</tr>
<tr>
<td><strong>UTI 2</strong>: Microbiology of asymptomatic bacteriuria in elderly patients</td>
<td></td>
</tr>
<tr>
<td><strong>MEMORABLE</strong>: Developing a framework for a novel multi-disciplinary, multi-agency intervention(s), to improve medication management in older people on complex medication regimens resident in the community</td>
<td></td>
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<tr>
<td><strong>100,000 Genomes Project Bio resource - Main phase</strong></td>
<td></td>
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<tr>
<td><strong>The ActiveCHILD study</strong>: Understanding behavioural pathways and interventions for physical activity and health in children with physical limitations v1</td>
<td></td>
</tr>
<tr>
<td><strong>SUPPORT TIA</strong>: Structured follow-Up Pathway to imProve management Of Residual impairmenTs and patients' quality of life after Transient Ischaemic Attack and minor stroke: Intervention refinement and feasibility study.</td>
<td></td>
</tr>
<tr>
<td><strong>EXTOD</strong>: Supporting adults with Type 1 Diabetes to undertake exercise; Developing and piloting an education programme for exercise in Type 1 diabetes: EXercise for Type 1 Diabetes education</td>
<td></td>
</tr>
<tr>
<td><strong>OCCULT</strong>: Prevalence of occult bone disease due to vitamin D deficiency in sudden unexpected death in childhood: A post-mortem study</td>
<td></td>
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</tbody>
</table>

#### Studies not eligible for adoption onto the National Institute for Health Research Portfolio

<table>
<thead>
<tr>
<th>Study</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Walker Study</strong>: A pilot investigation into frequent fallers' experiences of an adapted walking frame, designed to reduce the walking aid's associated falls risk.</td>
<td></td>
</tr>
<tr>
<td><strong>DeSSiP</strong>: A qualitative study to explore primary care as a setting for the delivery of secondhand smoke harm reduction messages, in cases where adults and/or children are exposed to secondhand smoke in home environments.</td>
<td></td>
</tr>
<tr>
<td><strong>Effectiveness of treatment for class II malocclusions with the Button &amp; Bead or Twin-block functional appliance</strong>: A single centre randomised clinical trial</td>
<td></td>
</tr>
<tr>
<td><strong>Building a culture of openness across the healthcare system</strong>: From transparency through learning to improvement? (Sub-study 1a: telephone interviews with senior stakeholders)</td>
<td></td>
</tr>
<tr>
<td><strong>The NHS duty of candour - a step forwards?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>In the Era of Brexit</strong>: The Barriers and Facilitators to Reverse Innovation</td>
<td></td>
</tr>
<tr>
<td><strong>CPR Spine Register</strong></td>
<td></td>
</tr>
<tr>
<td><strong>What are the experiences of adults with Intellectual Disability and Dysphagia? An exploratory</strong></td>
<td></td>
</tr>
<tr>
<td>Studies not eligible for adoption onto the National Institute for Health Research Portfolio study.</td>
<td></td>
</tr>
<tr>
<td>Learning from key stakeholders to improve discharge services: A case study of a supported integrated discharge service involving staff, patents and carers</td>
<td></td>
</tr>
<tr>
<td>Oro-facial MoCa: Severity of dentofacial deformity in profile: A patients perspective.</td>
<td></td>
</tr>
</tbody>
</table>
**Reports from the Divisions**

(Lists of Publications and Grants Awarded are available for each Division in a separate document)

**Adults and Communities**

*Summary provided by the R&I Team on behalf of this Division.*

The adult community services continue to express an interest in research but lack capacity to engage with research more fully. Although research development is slow there has been an increase in portfolio and non-portfolio studies over the past few years showing a gradual increase in research engagement. These studies have involved the diabetes service, Parkinson nurses, dietetics team and community nurses. The on-going portfolio study called Memorable is a framework for a novel multi-disciplinary, multi-agency intervention, to improve medication management in older people on complex medication regimens. This project has recruited staff and carers and is led by the Medicine Management Research Lead in collaboration with Aston University.

There are at least 4 new studies currently in set-up one of them is the Thrive trial to evaluate a new service to improve health and work outcomes and will use variants of the Individual Placement and Support (IPS) model of supported employment. The trial will assess whether an IPS intervention has the impact of improving health, wellbeing and employment outcomes beyond what can be achieved with ‘business as usual’ among participants. This study will involve the district nurses.

Due to limited capacity, research support for the future will be developed over a number of years; this will include introducing staff to small research and training opportunities in the first instance. Within a few years the research culture will be embedded across the service and the R&I team will work closely with the research lead Liza Walsh and the service leads to identify any possible opportunities within the constraints previously described.

**Children and Families**

*Research Leads – Dr Joanna Garstang – Consultant Community Paediatrician, Marilyn Poole – Senior Paediatric Physiotherapist.*

*Progress made in relation to our 2016/17 divisional research strategy during 2017/18:*

- **Develop research experience by recruiting to established research projects, particularly those on the NIHR portfolio**

The division have participated in numerous non-commercial NIHR portfolio studies. Three studies that opened in 2016/17 closed in 2017/18. Seven remain open to recruitment. Two additional non-portfolio study are also open to recruitment at present. Staff from a range of disciplines, including paediatricians, physiotherapists, nursing staff and health visitors have acted/ are acting as local collaborators or principal investigators for these studies. Backfill has been provided for participating staff for some studies.

One new NIHR portfolio project is currently being set up. Feasibility of involvement in a further 5 studies is under investigation, and two expressions of interest have been made for studies under development.

- **Support research interested staff doing research as part of degrees, in applying for NIHR MRes programmes and in applications for higher research degrees.**
Physiotherapist Marilyn Poole successfully completed the Birmingham Health Partners Masters to Doctorate Bridging Programme as part of the Clinical Academic Internship Programme, and plans to apply for an NIHR Clinical Doctoral Research Fellowship in spring 2018.

Dr Garstang is being supported by BCHC R&I for one half-day per week to apply for external funding to continue her post-doctoral research

- **Start and grow our ability to act as co-applicants and eventually as principal investigators on peer reviewed research applications.**

Marilyn Poole acted as Chief Investigator for an NIHR portfolio study (which closed in Autumn 2017), and as a co-applicant in a successful NIHR Invention for Innovation grant application in partnership with a small to medium enterprise (MIRA Rehab Ltd).

Jo Garstang is Principal Investigator on an NIHR portfolio study examining the relationship between Vitamin D and bone strength in unexpected infant death.

Doug Simkiss is Joint Principal Investigator on an outline proposal for NIHR Health Services and Delivery Research Programme commissioned call: Health and social care services support for transition of Looked After children and Young people (LAYP) leaving care.

Physiotherapist Christel Corbett has undertaken principal investigator training to support her involvement in portfolio studies and plan to undertake this role if a current expression of interest is successful.

- **Encourage paediatric trainees to take part in research projects to help build capacity in community child health research**

Jo Garstang is leading on developing this work.

- **Build on existing relationships with local universities, West Midlands Clinical Research Network (WMCRN), surrounding acute trusts and potential commercial partners to maximise research capacity.**

Dr. Doug Simkiss is working with Professor Richard Lifford from the University of Warwick and Professor Dan Lasserman from the University of Birmingham to see if evaluation of the Child Health Improvement Programme can be part of a CLAHRC 3 bid from the West Midlands.

A meeting was held with Prof. Jeremy Kirk, Research Director at Birmingham Women’s and Children’s NHS Foundation Trust and Clinical Director of the West Midlands Clinical Research Network, to discuss research collaborations and partnerships between the Women's and Children's Hospitals and BCHC. Marilyn Poole was invited by Jeremy Kirk, chair of the WMCRN to present her research journey at the WMCRN Partnership Group Meeting in March 2018, and was subsequently invited to the west Midlands Clinical Research Network Strategy day to represent non-medical clinical researchers.

Dr Jo Garstang is continuing to work with the University of Warwick and University of East Anglia as a researcher for the triennial analysis of Serious Case Review.

Successful NIHR Invention for Innovation grant application in partnership with a small to medium enterprise (MIRA Rehab Ltd).

Marilyn Poole is developing an NIHR Clinical Doctoral Research Fellowship application in partnership with Professor Joan Duda, Dr. Sally Fenton and Dr. Sue Neilson at the University of Birmingham, and support from Dr. Elizabeth Croot at the University of Sheffield.
Dr Carolyn Bradbury-Jones based in the School of Nursing at the University of Birmingham has an honorary contract with BCHC, and made a grant application to the NIHR Health Services and Delivery Research Programme in May 17 to develop a new domestic abuse training and referral pathway for health visiting teams in England. Unfortunately this was unsuccessful.

Future plans in relation to the Children and Families R&I strategy:

- The Children and Families research leads wish to focus projects developed within the division around particular research themes. The themes are: vulnerable children with social needs, children with complex health needs, public health and a cross cutting theme of utilisation of technology in health care.
- In addition to supporting research interested / active staff as they do currently, the research leads will present at relevant meetings and events and plan workshops to proactively enrol more staff in research roles, and encourage staff to recruit to existing studies.
- The research leads will identify academic staff with interests aligning with the divisions chosen research themes, and open dialogue with them in relation to forming contractual partnerships to develop new grant applications and participating in existing projects they are involved in within the division.

Other successes include:

- D Simkiss is chair of the ASD-UK database research steering group for the University of Newcastle
- D Simkiss is a member of the CLAHRC West Midlands Theme 1 (Maternity and Children) Steering Group
- D Simkiss is chair of the Trial Steering Group for EPPIC-ID a NIHR HTA trial – ‘Clinical and cost effectiveness of a parent mediated intervention to reduce challenging behaviour in pre-schoolers with moderate to severe learning disability: a RCT’
- D Simkiss is member of the editorial boards of Paediatrics and Child Health and the Journal of Tropical Pediatrics
- D Simkiss appointed as an Expert Advisor for the NICE Centre for Guidelines to give advice on the impact of new evidence on guidance, participate in committees as a topic specialist member and perform peer reviews of guidance
- Jo Garstang is a member of the national steering committee of the Care of Next Infant scheme at the Lullaby Trust contributing to on-going research into unexpected infant deaths
- Jo Garstang has given several presentations at national and international conferences concerning Sudden Unexpected Death in Infancy and Child Death Review.
- Marilyn Poole presented the story of her research journey at the Association of Paediatric Chartered Physiotherapists annual conference in November 2017.

Dental Hospital

Research Lead – Professor Iain Chapple

Organisation and Environment. Birmingham Dental School and Hospital ranked number 1 from among 94 submissions in the Research Excellence Framework (REF) 2014 for research outputs: with 98.5% of manuscripts judged to be world leading or internationally excellent. We rank 19th in QS World University League Tables in Dentistry, the number one Dental School outside of London, and most importantly 8th in terms of citations per publication (an indicator of research influence and impact), the highest ranking UK school.

Today we continue to build upon this outstanding academic success, underpinned by a symbiotic working relationship between the University of Birmingham (UoB) and Birmingham Community Health Care Foundation Trust (BCHCFT), who share a bespoke laboratory and clinical facility,
enjoy dual contracts and shared responsibilities for research and development. This is an essential symbiosis in order to achieve research excellence alongside student satisfaction scores of over 90%, in addition to clinical service leadership in primary, secondary and tertiary care settings.

We occupy a state-of-the-art purpose build Hospital/School of 15,456m² including 914m² prime clinical spaces and 675m² prime research laboratories supported by a fully licensed biorepository (HTA license 12313), two ethically approved tissue banks and liquid nitrogen storage compound, with -80°C back-up. Substantial investments in these facilities (inspected and commended by the Human Tissue Authority in 2016) enable our investigators and students to harness cutting edge technology and equipment to accelerate scientific innovation for patient benefit. Indeed, we have invested almost £1M in research equipment infrastructure over the last 5 years.

We serve a large and diverse local population of ~5.5 million: with ~120,000 attendances annually. We also influence national oral healthcare policy through ongoing engagement with a range of organisations dedicated to clinical care, education, research, business and government. For example, we work with a consortium of UK Dental Schools and the Office for National Statistics to ensure robust national dental health surveys for adults and children. We maintain strong and fruitful partnerships with executive agencies such as Public Health England and NHS England, charities such as DEBRA and the Oral and Dental Research Trust, and pharmaceutical companies such as GlaxoSmithKline, Unilever and Philips (GlaxoSmithKline for more than 25 years, Unilever more than 20 years, Philips more than 15 years).

Our international relations likewise comprise higher education institutions and networks such as Universitas 21, commercial organisations, educational groups such as the Association for Dental Education in Europe (ADEE), and professional groups such as the European Federation of Periodontology (EFP) and International Association for Dental Research (IADR) with whom we are Institutional. Highlights among our projects with collaborators worldwide include studies with partner teams in China, Brazil and the United States.

Over the last 6 years we have published 221 manuscripts across 201 unique international University partners, and the strengths of the vibrant and supportive research environment we offer to early career investigators are borne out in 4 Distinguished Young Investigator awards from the International Association for Dental Research (IADR) in the last 12 years. In 2018 we also achieved a Distinguished Scientist Award of the IADR. Thus, we already demonstrate a strong global footprint, which we aim to consolidate and grow in the months and years ahead through a number of strategic academic appointments and vibrant connections to other Institutes, Colleges and professional services of the University: exploiting internal assets to respond swiftly and flexibly to emerging priorities in the research landscape.

**Thematic Highlights**

Collectively our researchers aim to develop excellence in basic and clinical science to promote human oral and general health: to realise our vision of *Oral Health for a Better Life*. Many of our studies cut across disciplinary boundaries, broaching not only biology, medicine and surgery but also chemical and mechanical engineering, materials science, metallurgy, medical sociology, and applied health. The portfolio is characterised by 2 overarching themes matured since REF 2014: with a clear translational pipeline from discovery science to applied service delivery:

- Clinical and Experimental Oral Sciences
- Oral Regeneration & Rehabilitation Sciences

These themes are underpinned by a number of more specific research groupings that collectively realise the critical mass and synergy required to understand complex mechanisms of disease, to provide innovative diagnostic and therapeutic solutions, and to improve quality of life. Cognate
teams share complementary expertise and facilities to mutual advantage in the co-supervision of doctoral studentships, joint staff appointments (such as Wiench with the Institute of Cancer & Genomic Sciences and Kuehne with the Institute of Microbiology & Infection) and joint publications.

Research themes with productive and vibrant collaborations institutionally, regionally, nationally and internationally.

Below we highlight some of the achievements and activities of these and other groupings (further details are available in the list of research awards, publications and markers of esteem that follow this section).

Clinical and Experimental Oral Sciences

Clinical Epidemiology and Dental Public Health

- We have completed the NIHR RfPB-funded study “OPERA” investigating the impact of periodontal interventions on rheumatoid arthritis, and papers are published and in press.
- The periodontal research group (PRG) is exploring how periodontal inflammation may act as a trigger for the onset and/or progression of rheumatoid arthritis, funded by awards from the European Commission, CRUK and NIHR.
- The PRG has recruited nearly 800 patients into a study considering the impact of periodontitis upon chronic kidney disease/failure and cardiovascular endpoints. We have demonstrated reduced survival rates in CKD patients with periodontal diseases and an interventional study funded by NIHR “INSPIRED” is at an advanced stage.
- The PRG is also involved in a new study investigating risk-targeted early detection of diabetes in primary dental care settings and pharmacies.
- The PRG is led a Europe-wide Initial Training Network (ITN) worth over €4M and also completed another ITN “TRIGGER” exploring the impact of periodontitis on chronic obstructive pulmonary disease.

Periodontal Research

- The PRG has developed a new portfolio project to explore screening for systemic non-communicable diseases in primary care dental practice: the SUCCESS study has attracted charitable funding. It also influenced a Department of Health Project Initiation Document (PID) exploring the role of the dental team in supporting the management of
diabetes patients’ in general dental practice through the Office of the Chief Dental Officer.

- The PRG just completed a doctoral fellowship award from NIHR for Mr Praveen Sharma to conduct a pilot study of the impact of periodontal therapy on patients with chronic kidney disease (INSPIRED).
- The PRG has completed a phase 3 randomised controlled trial on mucosal sloughing induced by toothpastes in collaboration with, and funded by, Unilever.
- The PRG has characterised the saliva and crevicular fluid proteome in health, gingivitis and mild and severe periodontitis, through a project designed at novel biomarker discovery. These data look very exciting and in collaboration with Philips the team has filed 9 US patents with focus on saliva diagnostic for periodontal diseases, and novel saliva early diagnostic for rheumatoid arthritis respectively.
- The PRG has also unravelled the pathological basis of tooth loss in patients with Papillon-Lefevre syndrome.
- Our spinout company Oral Health Innovations has rolled out risk prediction technology in over 600 dental practices, and over 115,000 patients have been assessed using the DEPPA and Previser systems by over 800 dental surgeons. Independent studies have deployed this technology to demonstrate significant improvements in patient cognition, behavioural change and clinical oral health outcomes (Kings College London).
- The PRG has also been instrumental in the development of the 2018 World Classification of Periodontal Diseases and Conditions published June 2018 with our team as senior authors.

Ultrasonics and Nanotechnology

- We are working towards the development of innovative ultrasonic scalers, exploiting the production of cavitation bubbles at the water-tooth interface to remove plaque. This is funded by EPSRC and is interdisciplinary working with the School of Mathematics.
- We are also collaborating with researchers within the UoB School of Chemistry to develop nanoparticle-containing biomaterials for dental uses.
- “Surgery enabled by ultrasonics”. Birmingham is awarded £1.1 million pounds as part of a 5 University consortium Glasgow -Lead (Engineering) Edinburgh (Orthopaedics), Leeds (Robotics), Southampton (Solid Mechanics), Birmingham (cell regeneration). Total grant awarded by the EPSRC is £6 million to the consortium for 5 years.

Oral Cancer Biology

- Through EPSRC investment, we are developing novel algorithms for intelligent microscopy to enhance histopathological tissue image interpretation.
- We recently initiated a new programme of research with a focus on cancer epigenetics, working with oncological specialists to advance mechanistic understandings of oral cancer and treatment.

Biophotonics Group

- NIHR funding has enabled us to develop a novel prototype device for dental phototherapy and accelerated wound healing.
- We recently secured MoD investment to develop novel therapies for wound-related injuries. In a related project funded by the NIHR Surgical Reconstruction and Microbiology Research Centre (NIHR SRMRC), we are pioneering photodisinfection.

Oral Regeneration and Rehabilitation Sciences

Dental, Implant and Bone Materials

- Ongoing studies of the abrasive properties of dentifrices are informing the development of novel toothpastes that minimise tooth wear whilst optimising cleaning and stain
removal.

- NIHR-funded research undertaken via the national synchrotron science facility (the Diamond Light Source) has demonstrated that titanium biomedical implants not associated with significant wear processes can deteriorate, leading to an accumulation of debris in neighbouring tissues, with implications for implant survival.
- We are developing an optimised, spring reinforced tissue engineered bone-to-bone ligament replacement, that will exhibit sufficient mechanical integrity to be implanted into a fully load bearing animal model.
- Innovative research is underway to develop novel ceramic, resin-based and cement-based biomaterials with dental and orthopaedic applications. Crucially, we aim to optimise biocompatibility: studying cell and tissue interactions and, where possible, correlating them with clinical performance.
- Our research in metallurgy will develop and characterise novel metallic implant materials. Further studies will develop materials for dental and orthopaedic use incorporating antimicrobial properties to prevent infection and implant failure.
- We have filed a patent with Orthos Ltd, to intellectually protect a novel accelerated setting MTA-based material for use in root canal therapy.

**Stem Cell, Pulp, Bone and Mucosal Tissue Engineering**

- NIHR investment enables our development of a novel light-emitting device to minimise pain and accelerate tooth tissue repair following trauma associated with dental treatment.
- MoD monies support our investigations of the potential (including antimicrobial potential) of low level light therapy for treating dental trauma on the battlefield.
- We are investigating therapeutic opportunities for dental pulp stem cells to support and promote neuronal survival and regeneration, in particular utilising the neurotropic effects of DPSCs to regenerate damaged optic nerve tissue.
- We continue to collaborate with biomedical engineers and metallurgists to develop encapsulated implantable devices to promote bone and tissue regeneration as well as bone and tissue repair.

**Interdisciplinary Collaborations**

Our interdisciplinary research is strengthened by active associations with UoB Schools of Pharmacy and Nursing within the Institute of Clinical Sciences, and with other investigators throughout and beyond the College of Medical and Dental Sciences. We work successfully with other disciplines such as Chemistry, Mathematics, Engineering and Metallurgy and Materials in research that will benefit patients. For example, we are exploring innovative pharmacological and pharmaceutical solutions for oral and craniofacial disorders and trauma. Our studies of tissue repair and regeneration also benefit from proximity to the NIHR Surgical Reconstruction and Microbiology Research Centre (SRMRC) within the para-campus of Birmingham Health Partners. Meanwhile the Institutes of Translational Medicine (ITM), Microbiology and Infection (IMI), and Inflammation & Ageing (IIA) facilitate collaborations between our dental researchers and counterparts in the fields of rheumatology, renal medicine, pulmonary medicine, and diabetes: enabling us to explore cardiovascular, bone and periodontal co-morbidities among well-characterised cohorts with chronic inflammatory diseases. The Institute of Cancer and Genomic Sciences (ICGS) hosts local collaborators with oncological expertise to advance our understanding of oral cancer.

We are also keen to build upon applied health partnerships to explore patient outcomes including quality of life for oral co-morbidities, combining experimental medicine studies in our joint dental-medical cohorts in chronic kidney disease, chronic obstructive pulmonary disease (COPD), rheumatoid arthritis and diabetes. For this purpose we are engaging with both health and social care providers and service users.
We are moreover pioneering the use of digital personalised biofeedback at the social-healthcare interface to drive patient and public ownership of and engagement with their health, via our spinout company Oral Health Innovations (integration of PreViser and DEPPA software into dental practice management software).

We are working towards European links post Brexit and are exploring dental links with Trinity College Dentistry and the University of Amsterdam (ACTA).

Our interdisciplinary collaborations are further promoted by the recent appointment of international honorary visiting Professors Ferracane (University of Oregon) and Nor (University of Michigan). We also regularly host visiting international researchers.

**Learning Disabilities service**

*Research Lead Dr Sunny Kalsy*

Research and Innovation in the Learning Disabilities service (LDS) continues to be widely supported and engaged in. The challenge has been to sustain the engagement and to incentivise the hard work and dedication of the clinical teams who are keen to develop and promote both their expertise and the important practice developments that have arisen through the range of research activities that they have led.

- **LDS Research Promotion, Engagement and Communication Events**

  The LDS Multidisciplinary ‘Research Interest Group’ (RIG) has been identified as an important support for clinicians involved in research the LD service. Therefore, consideration of rotational leadership, integration across service areas and embedding within the LDS Clinical Reference Groups (multidisciplinary clinical groups focused on key clinical themes or conditions) has been considered in order to ensure that the group is supported to continue.

  Details of the research and innovation projects and related activities are available on request. In summary, these have demonstrated that the foundation for clinical research is the need for clinical expertise, good governance and a culture of innovation and best practice.

- **LDS Research Challenges and Objectives 2017 – 2018**

  In 2016 – 2017, a number of challenges were identified to the delivery of clinical research within the LD Service:

  - The majority of studies on the portfolio are not suitable for the LD patient group or LD community service settings

  - The service clinical demands are such that many LDS practitioners are not able to fully commit to recruiting patients to studies or developing further as researchers.

  As recognised by other services in the Trust, effective research is developed and delivered by teams across different disciplines in the NHS and universities. Participating in and sustaining relationships in such teams requires an investment of time that is increasingly difficult in the current clinical climate. The LDS is keen to ensure that earlier Clinical Academic Programmes within LDS that were supported by the Trust over a decade ago are re-considered as a viable opportunity for the organisation to realise its research potential.

  Furthermore, with Transforming Care Together, the merger with Black Country Partnership Trust and Dudley & Walsall Mental Health Trust, the Learning Disabilities service will extend...
to be one of the top three largest services in the country. This size alone, will also support the scope and opportunity for the Learning Disabilities Service to realise its research potential and continue to demonstrate excellence in clinical practice and research.

These challenges formed a core part of the service objectives to support research and innovation with the LD Service and the following impacts were noted in responses to the challenges raised:

The nature of studies on portfolio is still an issue in terms of applicability for patients with LD. However, investment in non-portfolio research that set the foundation for future research e.g. EMDR project is potentially now yielding benefits with closer collaboration with multiple sites to submit for NIHR funding. The outcome of this application will be determined in 2018/2019.

The clinical demands for practitioners is still an issue and combined with workforce capacity within the LD Service over the last two quarters across 2017/2018, has had impact that needs to be attended to.

The lack of progress of Clinical Academic Programmes within the Trust is still a considerable challenge and whilst a number of clinical staff are undertaking Masters based clinical and research programmes, the opportunity to increase this to a critical mass is still dependent on a significant cultural and structural shift across the Trust.

During 2017-2018, there was considerable focus for LD on the potential TCT partnership. In terms of research, this process was captured in Benefit 4 of the LDS Clinical Integration plan with a high level objective: “Through economies of scale, enable development of clinical services through the adoption of best practice, innovation and research”. As the TCT partnership did not go ahead, these benefits were not furthered.

Conclusion & Objectives for LDS in 2018-2019

The range of activity across professional disciplines within the LD service continues to demonstrate the evolving development of an active research culture within the LD service. Key deliverables relates to the multidisciplinary interest and appetite for research and the desire to ensure that good quality clinical practice is at the heart of research initiation and development. The activities highlighted also demonstrate that the LD service is both an active consumer and conductor of research and innovation. It is therefore key to ensure that the momentum that has been developing over the past few years is sustained and developed.

The following high level objectives have been identified for the LD Service as it moves into becoming a Division in the Trust from April 2018:

- The model of Clinical Reference Groups (CRGs) will become a core part of the Divisional Clinical Strategy
- Clinical Effectiveness including research and innovation will be championed through the CRGs and will include those benefits highlighted through the work in with TCT partnership
- The CRGs will deploy clinical effectiveness programmes (e.g. audit and service evaluations) to benchmark practice and therefore identify gaps and benefits for future research and innovation
- Student placements and internships will be reviewed to determine whether there is additional research capacity and capability within the Division to support locally driven research and innovation for provision that does not fall within the remit of the CRGs
- The Divisional professional disciplines will continue to develop links with Academic institutions and national bodies such as NHSE to highlight the potential clinical research has to change policy and practice and also act as host organisations for research projects where relevant to the core business of the Division and the Trust
Rehabilitation Services

Research Lead – Dr Theresa Powell
Over this year the service has been involved in 9 non-commercial portfolio studies and 7 non-commercial non-portfolio studies which is a slight increase over last year. Three studies are in early phases and are not yet recruiting. BCHC is the sponsor for one of these studies, others being sponsored mainly by UoB.

Previous and on-going projects have resulted in three grant applications: one small grant application to Brain Research UK relating to navigation in people with brain injury was not successful; a large grant application for £250,000 to NIHR (FES for constipation) was not successful but is being revised and will be resubmitted and another large grant application for £400,000 has just been submitted to the Stroke Association (language game therapy) in collaboration with the universities of Aston, Sheffield and UCL (awaiting outcome).

Aside from grant applications, other impacts include publications and posters (details can be supplied on request). A project based at Moor Green looking at Acceptance after Brain injury won the DataBlitz prize at a recent international neurorehabilitation conference in Prague. Several presentations have been made at other national and international events this year, two based on a project in collaboration with University of Bradford relating to the economic impact of rehabilitation on carers (additional information available on request). A project relating to carers perceptions of cognitive impairment is likely to result in changes to local clinical practice in brain injury and a project relating to symbol aids for children who are non-speaking (in collaboration with Manchester Metropolitan University) will hopefully result in a communication aids tool kit in the coming year. We continue to work on developing practice guidelines relating to deep vein thrombosis in wheelchair users and guidelines for bariatric wheelchair users.

Last year we began to develop a series of processes to support a research strategy, these included; a central database for presentations and publications for research which we have implemented, access to research grant information using Grantfinder and use of our clinical forum as a context for discussing research. We hope to continue with these initiatives; however, the service has recently undergone some major changes, combining with other areas of the Trust to create a new division. This will result in greater and more diverse opportunities for research which will require a new strategy which we hope to address over the coming year within the resources currently available.

Urgent Care services

Summary provided by the R&I Team on behalf of this Division

The Urgent care service has embraced research and continues to increase their research activity. The first dementia study called Care Giving Hope was completed in 2016/17 and some preliminary findings are displayed in below –
The sum of successful portfolio and non-portfolio studies carried out in urgent care have increased over the last few years with further studies in the pipeline undergoing feasibility checks and capability and capacity assessments which will be reported on in the next annual report.

One member of staff supported by the R&I team has been successful with an application to the Clinical Academic Internship Partnership programme and one consultant is being supported by the University of Birmingham with his research ideas. As part of an academic collaboration initiative funded by the R&I team, one member of staff has successfully applied for mentoring of young researchers with academic staff at Birmingham City University and has submitted a research application.

Dr Manivannan the research lead has agreed that training can be offered to Doctors who would be interested in providing clinical oversight on research studies. Due to constraints within the service and also within the R&I team this has not happened yet, however it remains a significant element of the plans for growth and development within the service. The contribution of clinical oversight to studies will up skill the staff and be a great help across the Trust for future studies that we otherwise would not be able to take on. This aspirational plan will take a few years to become established.
2016/17 Activities against the BCHC Research Strategy and Innovation Strategy Objectives

Research

Promote and champion research within the BCHC staff group

Development of a Clinical Research Pathway:
The team supported staff to apply for Health Education England/National Institute for Health Research sponsored training programmes
i) Clinical Academic Internship Partnership (CAIP) and
ii) PhD Bridging programme.
Support was also provided for applications for PhD fellowships and other training opportunities. Individual applications are discussed with service line managers to identify appropriate research topics and work has begun to define the enhanced contribution the staff member can make on their return. In a bold strategic step we are keen to develop clinical academics housed not in academic institutions but within the NHS i.e. patient facing staff with dedicated time for research. This development of such staff will empower staff to identify priorities and ultimately improve healthcare.

Staff Training:
Free research training courses such as i) Good Clinical Practice, ii) how to take informed consent and
iii) principal investigator oversight training was promoted via the intranet.

Multidisciplinary Research Support:
backfill and research support was provided to the MSK service for a member of staff to conduct two clinical trials, as a result the level of research awareness and participation has increased and also generated academic collaborations and the development of a new specialist group across the region. This model of working is an aspiration to be replicated in other services.

Research Nurse:
Following the success of strategic funding from the Clinical Research Network, BCHC was successful in gaining a research nurse in collaboration with the Black Country Partnership and Dudley and Walsall Mental Health Foundation Trust. The nurse is working across these Trusts with a particular emphasis on dementia and neurodegenerative studies. This initiative has resulted in an increased number of patients recruited into studies and close relationships with neighbouring Trusts.

Dementia Training and Steering Committee Representation:
The R&I team provides a research focus at the enhanced dementia training and a representative attends the quarterly dementia steering committee.

Make the BCHC research offer more competitive

Commercial clinical research organisations (CRO)
Discussions have commenced with two commercial CRO to explore the possibility of them setting up a clinical trial unit within BCHC or utilising facilities they already have in the Birmingham area. We currently have very limited ability to take on commercial interventional clinical trials for a number of reasons for example, we lack clinic space for the extra time needed for research projects, clinicians struggle to free up the time required for these often time demanding projects. Collaboration would potentially bring the necessary skills and infra-structure to allow us to engage with such projects.
Collaboration for Leadership in Applied Health Research and Care (CLAHRC)

These academically led national initiatives create collaborative opportunities which are generated in 5 year cycles. BCHC has had minimal input in the previous two programmes however there is an opportunity to develop significant engagement in the third cycle beginning in 2019. Preparation is underway to reposition the Trust for engagement within the next application which will involve close working with partners to address healthcare challenges under several themed areas.

Reduce financial risks – increase financial stability

Funding databases:
iDox Grantfinder and Research Connect software has been purchased for a trial period. Limited email access has been shared across all relevant services that may require access to funding bodies for R&I projects, training and travel funds. An increase in funding applications will ultimately lead to an increase in generated income.

Academic Partnerships:
Following the success of strategic funding in 2016, £43k was won to establish an academic supported working relationship with the Institute for Applied Health Research at the University of Birmingham. Other academic arrangements and collaborations were also developed with Birmingham City University and Aston University. As new bid applications are submitted.

Make BCHC fit for purpose to sustain and attract high quality research

Development of a Community Trust Alliance:
BCHC is leading on a community alliance initiative across England. Key actions include developing methods to share research projects, sharing best practice and generating new research studies specific to a Community setting.

Service Level Agreement (SLA) between R&I and Finance department:
To generate an increased number of research bids the R&I team are working closely with the finance team to identify how to align our stringent requirements to the service which will require an SLA. This contribution will assist the team to work to bid deadlines efficiently and effectively using the DoH Acord document.

Patient Research Ambassador (PRA):
Roger Leek has agreed to represent BCHC as the PRA, this role will lead on supporting the promotion of research to other patients and carers and contribute to the design of new research. Plans are in place to increase the number of PRA’s in the near future.

Awards

Highly Commended – Best Overall Performance Award 2017 from the Clinical Research Network West Midlands.

The Trust received an award for its contribution to research in the area of older adults from the Clinical Research Network West Midlands.
Innovation

Establish a central innovation function for the Trust:

Virtual Innovation Forum (VIF): An online has been set up for all BCHC staff to join for participation in Innovation. This platform provides a depository of technologies identified to be of relevance to the Trust and a central location for managing the incoming submission from staff about Challenges/Innovative ideas.

Position BCHC to take advantage of local, regional and national innovation initiatives

Technology Evaluation:
A Clinical team led by Dr Tadvi Julkiflahan at Moseley Hill Hospital (MHH) carried out a user evaluation and usability assessment of a rehabilitation exoskeleton, made by Rex bionics. This gave the clinicians at MHH the opportunity to allow stroke patients and patients with spinal cord injuries to test the equipment for usability. In addition, more than 20 clinicians had the opportunity to be trained on the use of the device and provided their feedback on usability. Innovation Manager presented the results at the launch event of the National Institute for Health Research Trauma and Management Medtech Cooperative at the Queen Elizabeth Hospital and Dr Tadvi presented this at a conference. It was also published in the Archway in January 2018.

NHS England’s Test Bed Programme:
Two Expressions of Interest were submitted to InnovateUK against the Test Bed Wave 2 funding call -
1. Keeping People Well at Home: A project with a focus of utilising remote monitoring technologies to enable self-care and independence in management of long-term conditions
2. Multidisciplinary Therapy Hub with Virtual Clinics: Utilising technologies to enable a holistic approach to well-being of patients through virtual clinics held at an Multi-Disciplinary Team Hub at St Stephens centre.

West Midlands Academic Health Science Network (WM AHSN):
WM AHSN are the organisation with a remit of facilitating adoption of innovations into the NHS. They facilitated an innovation workshop at BCHC where challenges and barriers to innovation were identified, along with available resources and opportunities. 4 work streams were identified to progress innovation to the next level at BCHC:
- Develop a value proposition for innovation at Transforming Care Together
- Develop innovation pathway (processes and policies)
- Identify and develop Transforming Care Together Innovation Champions
- Develop industry engagement offer to ensure Transforming Care Together is the go to place for testing innovation.
Increase income for a sustainable innovation function and leadership

**Innovation Engine 2** project has been the source of income for Innovation:

<table>
<thead>
<tr>
<th>IE2 Income</th>
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<tr>
<td>£188,202.15</td>
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<tr>
<td>£128,019.15</td>
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</table>

Promote and champion innovation within the BCHC staff group

**Research Support from Birmingham City University (BCU):**

BCU were commissioned to deliver a further 18 months of research training and support for BCHC staff.

**Health Technology Newsletter:**

Innovation Manager, Hamid Zolfagharinia, launched the first issue of the Health Technology Newsletters in January 2018. This is a brief email listing 2-3 innovative technologies relevant to community healthcare and 1-2 news updates in this area. We are looking to expand the audience of the newsletter and all entries are welcome.

**Games Workshop and Traffic Life Launch:**

A games workshop was organised with Focus Games Ltd and BCHC Staff. The Traffic Life game was also launched at this event and the staff had a chance to play that game, along with a few other staff development games from Focus Games. The staff were also encouraged to come up with ideas of how board/card games approach could be utilised in tackling issues in their respective areas. A list of 15 ideas was generated and this was shared with Learning & Development for further development.

**Walker Study Closure:**

(This project combines both research and innovation): The invention of a staff member (Rehabilitation Physiotherapist Assistant) was researched for impact with the assistance of the R&I team and supervision from a senior researcher at Birmingham City University. The study was closed in October 2017. Other funding streams are being investigated, to allow a further proof of

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This project has mandate of delivering assistance to SME’s for development of innovative solutions, products and processes in health, transport and sustainability. Innovation Birmingham are the project managers and the delivery partners are Innovation Engine, BCHC, University Hospital Birmingham NHS Foundation Trust, amey, Birmingham City University, European Union (European Regional Development Fund), Innovation Birmingham, Centro and University of Birmingham.

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concept study where impact assessment tools would be validated before a full on clinical trial is set up to assess the impact of the intervention on a larger BCHC patient population.

**Patient-Centred Solutions Event on 21st June 2017:**
An event was held where 15 health-related technology providers gave 5-min presentations to encourage collaborations with BCHC on healthcare innovation. Videos of the presentations and the slides along with additional information can be found on the Virtual Innovation Forum.

**Meridian Live event 15/02/2017:**
Regional Innovations in the region were presented at this event which was organised by the WM AHSN. Our Trust showcased 3 of its most recent innovations at a stand: “Traffic Life Game”, the “Virtual Reality Tool” and the “BabyCheck App”. There was also a joint presentation from BCHC with Focus Games around the success of Traffic Life game.

**Ensure innovation serves patients, staff members and the Trust**

**100,000 Genome Project:**
R&I Led BCHC on joining the 100,000 Genome project as the first Community Healthcare NHS Trust. We are set to start recruitment in August. This will give an opportunity of a whole genome sequencing to our patients with rare diseases and will ultimately help improve patient care for all affected by these conditions.

We are pleased to inform that after months of perseverance and planning, we have managed to recruit 37 subjects to the Rare Diseases arm of this study from December 2017 to end of March 2018. This outstanding achievement only became possible by the efforts of the colleagues in Children & Families division and assisted by the R&I team and staff from University Hospital Birmingham. The recruitments will also contribute to our Research Accrual target set by the local Clinical Research Network.

**SPeAC Happy App trial:**
BCHC has now commissioned a trial of this staff live feedback tool in two of the wards at MHH as well as by one of the Health Visiting teams.

**SME Engagement:**

**Update regarding the progress of Business Assists:**

![Business Assists (Target = 30 to be Complete by Dec 2018)](chart)
Here are some updates regarding some of the business assists:

**B13 Technologies and Clinical Handbook in C&F Division:**
B13 Technologies, a software development company, were commissioned to develop an App for the Clinical Handbook in use in the Children and Families division. The agreement was reached in March 2018 for the work to be commissioned and started as soon as possible.

**Hawk Technical Energy Performance Review:**
Hawk Technical, an energy consultancy company, met with the Estates and R&I team on site at West Heath Hospital (WHH) for a review of the premises to start the development of a 3D model for energy consumption modelling and making recommendations on improvements and savings. This will lead to better understanding of the status quo in terms of energy efficiency at WHH and the improvement plans.

**Acute Technology:**
This company has designed a remote medication monitoring technology that was previously tested by R&I team in 2016. The team partnered with them in the development of a funding application for National Institute for Health Research i4i Connect. Unfortunately, the company was not invited to the next stage of the funding application.

**Safekeeping Solutions:**
This company has designed a novel bed exit sensor and the R&I team were involved in the feasibility stages in 2016. With the help of R&I team they submitted an application to the National Institute for Health Research i4i Connect call and were invited to the second phase of the application. A PPI work package was defined as part of this project but the application was rejected as second stage.

**Applio Ltd:**
This company that specialises in developing digital games, was supported by the Tissue Viability team to improve the contents of their pressure Ulcer Prevention digital game.

**Staff Support**

**Easy-read maternity notes:**
These notes that were developed by the staff at the Learning Disabilities services were published on the BCHC website. These notes were translated from the NHS choices website material for the benefit of mothers or pregnant women with learning disabilities.

**Clinical Handbook App:**
The digital textbook for workstations was successfully launched. We are working with clinical photography to also make this available on smart devices. User details are now on the intranet and Patient Safety Lead has signed if off as successfully completed.

**Staff Assistance with Innovation:**
An innovation workshop was arranged in 2017 by R&I and delivered by an organisation called Good2Great where staff were taken through the process of innovation in healthcare.

**BabyCheck App:**
A meeting was held to review the 2nd version of the App and discuss research and post-market surveillance given that the app is now CE marked. The App will be relaunched, possibly at the Baby Show in London.
Well-being Tool:
A BCHC Physiotherapist, was supported by R&I to develop a concept for Well Being which she would like to develop with the Organisational Development Team.

Other Activities

VIP Awards:
Innovation Manager (Mr Hamid Zolfagharinia) was nominated for his contribution to the Trusts “Quality” standard and received an award as a finalist at the Annual General Meeting held in September 2017.

UHCW Visit:
A visit was arranged to University Hospitals Coventry and Warwickshire (UHCW) to discuss how innovation is managed at that Trust and look at the models of delivery to transfer learnings into BCHC. UHCW have an embedded AHSN/Midtech service with a dedicated Innovation Hub floor space. They also work very closely with clinical services to identify on-going innovations as well as existing challenges or ideas for innovation.

Research on Enabling Technologies for the Elderly:
This is a partnership with Coventry University and Holon Institute of Technology (HIT) in Israel to initiate international projects to trial health and well-being technologies for enabling elderly citizens. An Memorandum Of Understanding and Non-Disclosure Agreement is now in place to allow for the collaboration between the 3 organisations. A joint application to apply for funding from the prestigious 2018 Ageing BIRAX is suggested in October 2018.
## Abbreviations

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ABF</td>
<td>Activity Based Funding</td>
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<tr>
<td>AHSN</td>
<td>Academic Health Science Network</td>
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<td>BA</td>
<td>Business Assists</td>
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<tr>
<td>BCHC</td>
<td>Birmingham Community Healthcare NHS Foundation Trust</td>
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<tr>
<td>BCU</td>
<td>Birmingham City University</td>
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<tr>
<td>CAIP</td>
<td>Clinical Academic Internship Programme</td>
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<td>CDHS</td>
<td>Creative Digital Health Solutions</td>
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<tr>
<td>CRN</td>
<td>Clinical Research Network</td>
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<tr>
<td>ERDF</td>
<td>European Regional Development Fund</td>
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<tr>
<td>HLO</td>
<td>Higher Level Objectives</td>
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<tr>
<td>ICAP</td>
<td>Integrated Clinical Academic Programme</td>
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<td>IP</td>
<td>Intellectual Property</td>
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<tr>
<td>IE2</td>
<td>Innovation Engine 2</td>
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<td>MSK</td>
<td>Musculoskeletal</td>
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<td>NIHR</td>
<td>National Institute for Health Research</td>
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<td>PID</td>
<td>Performance in Initiating and Delivering Clinical Research</td>
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<tr>
<td>R&amp;I</td>
<td>Research and Innovation</td>
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<tr>
<td>RCF</td>
<td>Research Capability Funding</td>
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<td>SME</td>
<td>Small to Medium Enterprise</td>
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<td>MHH</td>
<td>Moseley Hill Hospital</td>
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<td>UK</td>
<td>United Kingdom</td>
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<td>UOB</td>
<td>University of Birmingham</td>
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<td>WM</td>
<td>West Midlands</td>
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<td>WTE</td>
<td>Whole Time Equivalent</td>
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<td>VIF</td>
<td>Virtual Innovation Forum</td>
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<td>WHH</td>
<td>West Heath Hospital</td>
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<tr>
<td>UHCW</td>
<td>University Hospitals Coventry and Warwickshire</td>
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