**PATIENT SAFETY TRANSLATIONAL RESEARCH CENTRE**

Annual Report 2013/14 (1 April 2013 – 31 March 2014)

1. **PSTRC DETAILS**

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<tr>
<th><strong>Name of the Patient Safety Translational Research Centre:</strong></th>
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<td>Imperial Patient Safety Translational Research Centre</td>
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**Contact details of the individual to whom any queries on this Annual Report will be referred, and to whom feedback on the annual report will be sent:**

**Name:** Professor Ara Darzi

**Job Title:** Professor of Surgery, Imperial PSTRC Director

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2. **DECLARATIONS AND SIGNATURES**

**Name and address of the NHS Organisation administering the NIHR Patient Safety Translational Research Centre award:**

**Name:** Imperial College Healthcare NHS Trust

**Address:** St Mary’s Hospital, Praed Street, London W2 1NY

**Name of the Chief Executive of the NHS organisation:**

Dr Tracy Batten

I hereby confirm, as Chief Executive of the NHS organisation administering the NIHR Research Centre for NHS Patient Safety Translational Research Centre award, that this Annual Report has been completed in accordance with the guidance issued by NIHR and provides an accurate representation of the activities of the NIHR PSTRC:

**Signature** ..................................................  **Date:** .................

(Chief Executive)
3. OVERVIEW OF ACTIVITIES (no more than two pages)

The Imperial Patient Safety Translational Research Centre (PSTRC) has made significant progress in the last twelve months and continues to drive impact in research and healthcare practice across its research themes and the wider academic and clinical networks that it fosters. The Centre has achieved notable milestones this year and has successfully realigned its strategic vision around an amended governance model, which includes the addition of a high profile, externally funded seventh research theme.

In December 2013, following the retirement of Professor Charles Vincent, the PSTRC’s founding Chair, Professor the Lord Ara Darzi was appointed Director and a revised governance structure was implemented. Mr Nick Cheshire, then acting CEO of Imperial College Healthcare NHS Trust, joined as the new Clinical Lead to provide a visible, leading platform for patient safety within Imperial Trust and ensure further dialogue between the scientific research and the clinical translation of our work. In parallel to these changes, the PSTRC absorbed the research and development programme of the National Reporting and Learning System, which is a large multi-domain body of work associated with a £3.7m grant from NHS England (described in more detail below). These amendments to the structures and sharpening of the strategy of the Centre have enabled new collaborations and supported some of the key translational research outputs of the last year.

Three highlights from the last financial year include, firstly, the establishment of the Health Innovation Exchange Centre (HELIX), which was enabled with a £2.8m grant from the Higher Education Funding Council for England (HEFCE). This new research centre embeds industrial designers within the clinical setting to identify, develop and promote healthcare and safety solutions across the clinical setting. Aligned within theme 2 of the PSTRC grant, this centre is developing a portfolio of patient safety solutions and has succeeded in its mission to engage the clinical and public communities. It has also hosted successful ‘Dragons Den’ style events to review pitches from patients and staff on new innovations that hope to directly impact patient safety.

A second achievement is the strategic adoption of the National Reporting and Learning System programme under the umbrella of the PSTRC. This high-profile national system was designed to capture patient and staff incident reports of adverse events and hosts a wealth of data and potential learning for patient safety. With dedicated funding from NHS England, this project has been incorporated as a new theme within the PSTRC. This theme draws on analytical and safety expertise from across the PSTRC, as well as design and technological insight, to advance clinical awareness and learning from an optimised system of patient safety incident reporting.

A third notable achievement is the delivery of a research paper from theme 1 (Effective Use of Information), ‘Day of week of procedure and 30 day mortality for elective surgery’, which was published in the British Medical Journal in November 2013. Looking at over four million elective procedures conducted in NHS hospitals in England between 2008 and 2011, the evidence illustrated deficiencies in the quality and safety of healthcare associated with weekend and out-of-hours care. The media interest around this research paper was cited as a key driver for new NHSIQ policy in establishing seven-day care in the NHS. This constitutes a major achievement for the Centre in influencing and improving the safety of wider NHS services.

In addition to these achievements, the PSTRC continues to deliver significant value and impact across its key short-, medium- and long-term objectives. This is achieved by developing basic patient safety research; implementing and evaluating patient safety interventions and improvement programmes; conducting translational research through our key strengths in design, technology and patient engagement; addressing the cost-effectiveness and policy implications of research; and ultimately, transforming healthcare delivery at the local, national and international level through the dissemination of newly formed evidence-based practice.

Developing and expanding the scientific basis for patient safety

The team in theme 4 (Teamwork, Skills and Safety) has collected and analysed large databases of observational data on clinical team working. This has allowed researchers to examine fundamental issues around how NHS staff directly contribute to resilient care delivery and patient safety. These databases, collected from operating theatres and cancer multidisciplinary teams, represent the largest such samples of reliably collected data in the UK. Researchers are now in the process of applying multivariate statistical analyses to these data, with the aim to derive normative performance benchmarks. These will help set criteria for the interpretation of team evaluations and drive improvement feedback.

Theme 3 (Patients, Carers and Families) explored patient safety issues from the perspective of elderly and frail patients in the community setting, which is historically under-investigated. This on-going project is exploring medication safety across community care and includes a systematic review to establish a foundational knowledge base of medication errors in the community setting and interviews with patients and their families and carers. The project will provide a means to assess the extent of the problem and to design
Conducting translational research through key areas of strength – including design, technology and patient engagement

Within theme 2 (Design and Technology), researchers have carried out comprehensive task analyses of clinical handover and have identified high-risk elements of current practices in the escalation of care across clinical settings – an established safety problem that leads to patient harm and poor outcomes. Based on this work, the research group have drawn on the multidisciplinary talents and software engineering capabilities of colleagues to confirm the technical specifications of a new software platform to facilitate safer clinical handovers. Work has been presented at international conferences and published in high-impact journals including *Annals of Surgery*.

Addressing the cost-effectiveness and policy implications of translational research

In theme 6 (Economics, Evaluation and Policy), a paper titled ‘Patient Safety in Hospitals – a Bayesian Analysis of Unobservable Hospital and Specialty level Risk Factors’ has been published in the high-impact journal *Health Economics*. Health policy experts and healthcare economists are working to establish new collaborations across the PSTRC themes to develop the economic case for patient safety innovation and new practices. Findings from research in this theme will be disseminated at prestigious international conferences including the ASHECon Congress in Los Angeles (June 2014) and iHEA/ECHE Congress in Dublin (July 2014).

Implementing and evaluating patient safety improvement programmes

The Centre has taken a step towards developing and directly implementing a large scale team-based intervention within medical wards, the HEADS UP project (Hospital Episode Analysis Describing Significant Unanticipated Problems). HEADS UP is a stepped wedge cluster-controlled trial of a simple intervention to translate staff concerns into tangible care quality improvements on medical wards. It involves a short, structured, daily briefing for the ward team that aims to address the failings of existing incident reporting systems. Five of the nine proposed clinical areas (wards) were enrolled into HEADS-UP by March 2014 – ward recruitment and data collection continue.

Wider dissemination of evidence-based practice

The Centre continues to produce impactful academic outputs (theme 4 had 30 peer-reviewed papers published/accepted last year) with publications in high impact factor journals such as *Annals of Surgery*, *British Medical Journal*, *British Journal of Surgery* and *Health Economics*.

Staff and investigators regularly present award-winning oral and poster presentations at international conferences such as the BMJ Forum and ISQua, in addition to other more specialised events, in order to promote and disseminate research findings nationally and internationally. The Centre also utilises an active website and social media streams to highlight research and to remain relevant to the wider patient safety and NHS communities.

The Centre will host the 2nd Annual CPSSQ/Imperial PSTRC Symposium in September 2014 where selected highlights of the PSTRC research agenda will be presented to NHS staff, the public and visitors from learned institutions across London and further afield.
4. PROGRESS MADE IN EACH RESEARCH THEME (no more than one page per theme)

We continue to make good progress against our objectives in all themes, focusing on effective translation of our research.

Theme 1. Effective Use of Information

Progress against objectives:

Development of safety indicators for primary and integrated care

- We examined the utility of using electronic records to identify adverse events using the General Practice Research Database and found an incidence of 6.0 adverse events per 1000 person-years. The low incidence of recorded adverse events was comparable with other studies, and so confirmed the potential of using electronic record data. (Tsang C et al. Br J Gen Pract 2013)
- We have used Primary Care data linked to hospital administrative data to examine emergency first time cancer admissions. (Tsang et al. BMC Health Services Research 2013)

Targeting improvements in care pathways

- We published research on the role of caseload in determining outcome following laparoscopic colorectal cancer resection (Burns et al. Surgical Endoscopy 2014), and found no relationship between volume of cases and any of the outcomes we examined (mortality/morbidity/return to theatre or readmission).
- In May 2013, we published research showing that patients undergoing planned surgery appear more likely to die if they have their operation at the end of the week, looking at over four million elective procedures conducted in NHS hospitals in England between 2008 and 2011 (Aylin et al. BMJ 2013). Our evidence points towards deficiencies in quality and safety of healthcare at the weekend in English NHS acute hospitals, and has led to pressure to improve out-of-hours care.

Use of information by clinical teams

- We have recruited an information analyst/developer supervised by the Medical Director in ICHT to work with researchers and to support a clinical information function to feedback performance information directly to clinicians and managers.

Examples of effective translation:

- For stroke we have developed 6 potential indicators of patient pathways. (Palmer et. al. Int. J. Quality Health Care 2013). The stroke care indicators have already been incorporated into a suite of information tools provided to the NHS by Dr Foster Intelligence.
- The media interest around our elective surgery paper was cited as a key driver in the NHSIQ policy paper ‘NHS services - open seven days a week: every day counts’ for the move towards seven day care in the NHS.

Major grants received:

We have received a NIHR award for project on Evaluation of National Surveillance System for Mortality Alerts, which will examine the impact of our mortality alerting system over a 30-month period.

There have been no major changes in strategy or leadership for this theme.
Theme 2. Design and Technology

Progress against objectives:

- We have identified the safety gaps in patient pathways that we aim to focus on including clinical handover and escalation of care.
- We have carried out task analyses of handover and escalation of care and have developed the technical specifications for a software platform to facilitate handover.
- We have completed initial studies into the use of the IDEAS prescription chart (a project sponsored by the Cabinet Office).
- We are completing trial (in conjunction with Department of Health) using SMS based interventions to reduce clinic do not attend rates. Initial analysis shows significant results.
- We have developed a suite of smartphone and tablet apps (including Event Tracker and OpNote) that are now ready to be tested in clinical environments.
- In response to the Technology and Design theme we have successfully launched the HELIX Centre (Healthcare Innovation Exchange) – a joint collaboration between the Royal College of Art and Imperial College London. The HELIX centre was launched at an event at the House of Lords in November 2013. The centre is based at the St Mary's Hospital site and has been supported by a £2.8 million grant from HEFCE. We have recruited a director of operations and 6 leading industrial designers as well as technologists and business experts. HELIX is the first centre of its kind in the Europe and will use its research strengths to explore how design can enhance patient care and patient safety. HELIX also sets out educate the next generation of design focused leaders through the development of a Masters in healthcare design and doctoral research programmes. [www.helixcentre.com](http://www.helixcentre.com)

Major grants received:

We obtained a grant of £350K from Lord Leonard and Lady Estelle Wolfson Foundation to support a Lecturer post. This builds on the £2.8m grant received from HEFCE last year.

Progress with theme leadership:

Dr Dominic King, a Clinical Lecturer in Surgery at Imperial College London, has taken over leadership of the theme.

Progress with the theme strategy:

The initial proposal set out a programme of work looking at the development of low costs surgical training simulators. Since writing the proposal, numerous commercial providers have entered the market and it was felt that this is no longer an area that we should pursue.
Theme 3. Patients, Carers and Families

Progress against objectives:

- We have collected and created a large database for the longitudinal recording and analysis of patient reported wellbeing post-surgery (N=1000+ patients).
- We have created one of the largest international databases on qualitative and quantitative facets of adult immunisation behaviour (N=2500+ members of the public, nationally representative of 3 countries).
- We have carried out a number of descriptive studies within the homecare and hospitals settings of patients’ views of safety and their contributions to it, which will form the basis for further larger scale study (a 2-year research appointment to investigate patients’ perceptions and utilisation of safety-related information in choosing care provider will start in September 2014).
- We have developed ‘MySurgery’ app aimed at enhancing patients’ understanding of the surgical care pathway and increasing their awareness of opportunities to contribute to the safety of their own care.

Progress with theme leadership:

This theme was led by Prof Charles Vincent, who retired from Imperial College in November 2013 and Dr Nick Sevdalis has taken over as theme lead.

Progress with theme strategy:

The strategy of this theme explicitly included linked work with theme 4 (also led by Nick Sevdalis) on patients’ contributions to safety within complex cancer care pathways. This remains a key direction to take. A clinical researcher will be recruited in June-July 2014 to undertake this work and preliminary data is due in 2014-15.

Examples of effective translation:

- In the 2nd and 3rd quarters of 2013, we carried out an expert review of patient involvement practices within Imperial College Healthcare NHS Trust, which directly involved patients of the Trust. The review identified areas of good practice and also areas where simple interventions have potential to improve the smoothness of patient journeys and overall patient experience. The results were summarised in a report, which was reviewed by the PSTRC Management Board, including two patient representatives on the Board. The report is now being finalised for submission to the nursing and patient experience leads of Imperial Trust (at Trust executive board level).
Theme 4. Teamwork, Skills and Safety

Progress against objectives:

- We have collated large-scale observational databases for the benchmarking of team functioning of surgical (N=700+ teams observed) and cancer teams (N=1000+ cancer case reviews observed).
- We have created novel tools for the evaluation of team functioning at ward level.
- We have developed and implemented data-driven intervention for surgical and cancer teams within NHS settings, in the form of a data feedback cycle. Teams are observed, then data are fed back to them and they decide how to improve their team working. Further observations then occur, to drive ongoing improvement.
- We have developed and implemented the HEADS UP team intervention – aiming to enhance team situation awareness at ward level and offer a data feedback mechanism between ward teams and service managers.

Progress with theme leadership:

Miss Sonal Arora, surgical lecturer and one of the PSTRC co-investigators, has been formally invited to attend future PSTRC Management Board meetings and will have a more direct contribution to the theme leadership and management.

Progress with theme strategy:

- Part of the early aims of the theme was a focus on the simulation-based development and validation of team interventions, with a particular emphasis on team leadership. Based on our ongoing interaction with NHS personnel and their quest for practical interventions that can be readily applied within the clinical setting, this year we adjusted our efforts to address this need. Simulation-based research as well as a practical exploration of team leadership within clinical care will be carried out, starting in 2014-15 (recruitment currently in progress).

Examples of effective translation:

- Instruments developed and validated within the theme are now in use in NHS Trusts to evaluate the effectiveness of their surgical team interventions (including the Royal London NHS Trust and also the Heart of England NHS Trust).
- An annual educational intervention on teams and their contribution to safety was rolled out in the North West London NHS Trust, as part of their surgical safety improvement initiative launched in 2013. We have been contributing materials and training to this intervention.
- A further annual educational intervention was developed collaboratively with surgeons of Northwick Park NHS Trust – the ‘Safety, leadership and innovation in colorectal surgery’ annual course (SLIC). The course is co-led by Sonal Arora and is aimed at senior and junior colorectal surgeons interested in improving the safety of their clinical practice. The course has now run for 2 consecutive years.
- The ‘Anaesthesia morbidity and mortality meetings: A practical toolkit for improvement’ was produced, based on work within this theme and nationally launched in the Annual Patient Safety meeting of the Royal College of Anaesthetists in Cardiff, in October 2013. The Toolkit has been disseminated to all departments of anaesthesia in the country and is the suggested resource for running M&M meetings. A national survey on its impact will follow by the Royal College of Anaesthetists.
Theme 5. Safer Systems

Progress against objectives/examples of effective translation:

**Safe medication use**

- We have made significant progress in developing methods of providing better feedback to hospital doctors on prescribing errors, and have explored the feasibility, acceptability and impact of our approach in two multi-site London trusts representing successful translation into practice. This was aided by additional funding (£72k) from a Health Foundation Shine award.
- Another evidence of successful translation is The Prescribing Improvement Model (PIM) implementation toolkit. We are currently working with Imperial AHSN to explore options for wider rollout.
- We have started to examine medication-related discussions during ward rounds with a view to identifying interventions to enhance safety; we have recruited a PhD student to explore this in more depth.
- We assisted CLARHC-funded colleagues with an evaluation of ‘My Medication Passport’, designed to communicate medication-related information between primary and secondary care; this collaborative work won an award at the 2013 Pharmacy Management National Symposium and will aid ongoing translation and rollout.
- A national census of electronic prescribing in English hospitals was completed. We found that although electronic prescribing is prevalent, it is heterogeneous, often in limited clinical areas, with limited functionality and with multiple systems operating in parallel. Even within established systems, the highest risk drugs are often prescribed on paper. We will next study the safety implications of multiple systems in the same organisation, and are part of a group awarded a £700k EPSRC grant to further explore hospital electronic prescribing as a case study within a larger programme on UK technology.
- We have begun collection of baseline data prior to electronic prescribing going live at Imperial to explore the patient safety implications of a large commercial US system being implemented in the UK. Using additional funding from a Health Foundation Insight award (£163k) we are also specifically examining inpatient involvement with medication safety and how this may be affected by electronic prescribing.

**Safe use of anti-infectives across the health system**

- The Imperial antibiotic smartphone app has been further developed and an evaluation due to commence. Within primary care, we have begun work on multiplatform applications to provide point-of-care antimicrobial prescribing support to GPs and antimicrobial information to patients, including a survey of GPs’ smartphone use and perceived utility of this approach which will support translation of our research into GP practice.
- A literature review to identify cross-sector antimicrobial stewardship models is under way, supporting development of indicators of safe anti-infectives use.

**Safer surgical systems**

- We have established a collaborative of 12 surgical units to undertake a programme of improvement in safety and quality over the next 3 years. A workshop in November 2013 identified considerable variability in structure and processes across the collaborative and prioritised areas of research.
- We are developing an early warning workforce planning toolkit to increase reliability in staffing provision and improve safety in clinical care, aided by additional funding from the Health Foundation Shared Purpose Scheme (£420K); this work is applicable to both medicine and surgery.
- We continue with recruitment of two CRFs for this theme (safer surgery and elderly care). We are hoping to have those posts filled in the second quarter of 2014.

**Major grant award obtained:**

- We obtained a further £557k NIHR HS&RD funding to explore errors in intravenous infusions and the potential role of smart pumps within the NHS; this work will start in July 2014.

There have been no major changes in strategy or leadership for this theme.

Progress against objectives:

The cost-effectiveness of patient safety initiatives

- Work is on-going on the project ‘Estimating the health burden and costs of patient safety events using English hospital data’ which analyses the impact on health and hospital resource use of six patient safety events (death in low mortality HRGs, decubitus ulcer, selected infections due to medical care, post-operative hip fracture, post-operative pulmonary embolism or deep vein thrombosis, and post-operative sepsis). The abstract of the paper has been submitted for presentation at international conferences.
- The collaborative project entitled ‘The Resource Use associated with the UK National Reporting and Learning System (NRLS)’ is in writing up stage.
- Project on ‘The Costs and Benefits of Multidisciplinary Team Meetings for Colorectal Surgery Patients: An explorative study’ is in analysis stage. It uses information on time costs and wages of consultants and other medical staff, and other costs, to calculate the costs of cancer MDTs.
- ‘The Cost-Effectiveness of Interventions to improve patient safety in hospitals: A Case Study of Surgical Safety Interventions’ BSc student project has been undertaken by a group of BSc students using aggregate (trust) level HES and qualitative analysis to investigate the impact of surgical safety interventions on hospitals and patients outcomes.

Economic Models of reporting and organisational learning

- ‘A theoretical model of in-hospital error reporting to improve health care quality’ project is in analysis stage and will analyse the incentives and disincentives for medical staff to report patient safety events in a theoretical behavioural economic framework. Ultimate objective is to inform policy makers on how to establish positive incentives for reporting, with the overall aim to improve organisational learning and quality of care in hospitals.

Econometric Models of Adverse Events

- We concluded the project on ‘Patient Safety in Hospitals – a Bayesian Analysis of Unobservable Hospital and Specialty level Risk Factors’. It investigated adverse events in hospitals, using Bayesian methods that allow disaggregating information on patient safety events at hospital speciality level.
- ‘The impact of expenditures on and duration of training of doctors on quality of hospital care: An analysis of OECD countries using Bayesian Model Averaging with multifactor error structure and endogenous covariate’ project will use novel econometric methods to analyse the impact of doctors training on quality of care, and health care expenditures, allowing for the fact that there is a reverse causality between quality and costs by using Instrumental Variable Methods.

Progress in theme leadership:

Professor Peter Smith has retired and stepped down from theme 6 in December 2013. Professor Darzi is currently leading this theme.
5. PATIENT AND PUBLIC INVOLVEMENT AND ENGAGEMENT (no more than one page)

We have greatly developed our levels of patient involvement and engagement in the last year, especially in light of the Francis report. We have drawn on guidance from INVOLVE, the partly NIHR-funded national patient advisory group, about involving and engaging effectively with patients and the public in as many aspects of our work as possible.

Patient and public involvement

Patient/public involvement in our research ranges from lay input on advisory panels to active members of the research team. A particular success is our approach in the IMPRESS study (Inpatient Medication and Patient Relationships – Electronic SystemS), where an expert patient, Fran Husson, was involved from the outset in developing the research proposal and participated in the funding interview. As part of this study, we also have five lay members on our advisory group. Feedback from this group suggested that we should include lay members in collecting data for this study. Following training, four of our lay members are now assisting with data collection by observing healthcare professional-patient interactions on the wards.

One of our two patient representatives, Jill Lloyd, has been involved in the Patients and Clinical Engagement Group (PCEG) for the Prescribing Improvement Model (PIM) study, which is now drawing to a close. She is establishing a patient group to inform development and dissemination of our research activities. Yasmin Alibhai-Brown has conducted meetings and observations with residents in public housing in Acton; asking them about their experiences of hospital services and their perceptions of safety and care.

We conducted an expert review of Imperial Trust’s patient involvement practices. A patient representative co-analysed qualitative results from interviews with patients and their carers in the homecare setting and designed the longitudinal study of surgical patients’ wellbeing following surgical complications (the study and metrics were designed based on interviews with patients who had suffered such complications). We are also in contact with two patient groups for the design and delivery of a survey on what information is important to gastrointestinal cancer patients in choosing their providers. Patients were also involved in the preliminary testing of the MySurgery app.

Public engagement

Our research outputs are designed with the patient and carer in mind. An engagement event for theme 5 ‘Working together to improve patient safety: focus on Healthcare Acquired Infections’ was held on the 28 May 2014 to explore emerging themes from our work and to inform our future research agenda. Professor Franklin is working with the Health Foundation to create a video aimed at both health care professionals and the public, which will feature some of our work.

We have run a number of public engagement events to introduce patients and the public to HELIX such as:

- Field research at the Imperial Festival – 200 members of the public contributed to a project to develop a new respiratory training device to reduce hospital acquired pneumonias.
- The Cell & Imagining the Future of Medicine at the Royal Albert Hall. Public exhibition to thousands of visitors to this event [http://www.helixcentre.com/2014/05/13/field-research-at-the-imperial-festival/](http://www.helixcentre.com/2014/05/13/field-research-at-the-imperial-festival/)
- App ‘dragons den’ – we asked for submissions from patients and staff for ideas to address patient safety problems. We had over 70 submissions including some from patients. We funded an idea from a chemotherapy patient at the Trust to develop an app to help monitor chemotherapy side

Our patient representatives in the Centre are in the process of setting up a network in collaboration with other Centres at Imperial College and ICHT. The aim is to form a ‘lay cohort’ to help identify areas for future research; advise on how best to involve patients and the public in our research; become involved in developing, designing and carrying out new research; and help disseminate our findings and recommendations.

We continue to engage the public through various social media platforms. Our website has been redesigned over the last 12 months in line with NIHR guidelines to make it more user-friendly and to make sure that we direct the public and patients to the information that can be relevant for them. The HELIX website is well designed and regularly updated with news of our projects: [www.helixcentre.com](http://www.helixcentre.com). We use our PSTRC and HELIX Twitter accounts to disseminate our research to over 300 followers. We have added a dedicated YouTube channel where videos from our first CPSSQ symposium can be viewed and commented on.

To engage Trust staff and patients and generate awareness of our research portfolio, we issued a call for proposals for a ‘Patient Safety Challenge’, which will fund the development of patient safety interventions that fall into the remit of our PSTRC themes. The shortlisted candidates will present on 18th June in front of panel of experts, in an open forum at the Trust and Imperial Campus.
6. TRAINING (no more than two pages)

Imperial College Healthcare NHS Trust (ICHT) and Imperial College London (ICL) are one of the UK’s first academic health science centres (AHSCs), combining the healthcare expertise of our five hospitals with the academic excellence of one of the world’s leading universities. We pride ourselves on the fact that we are consistently rated amongst the world’s best universities, with a reputation for excellence in teaching and research. This set up provides numerous training opportunities for all staff employed or associated with our Centre and it also gives our staff an opportunity to develop and provide training for our colleagues.

We continue to have an excellent training programme through our MSc in Safety and Quality, MSc Health Policy and wide ranging PhD programmes for clinical staff and researchers from other disciplines. The PSTRC staff education and training highlights from the last financial year include:

- Will Palmer (theme 1) submitted his thesis on *Measuring the quality and safety of hospital care using specialty-specific indicators based on routinely collected administrative data: a feasibility study* for examination on the at the end of March 2014.
- Monsey McLeod, PSTRC Research Pharmacist, was awarded her PhD on *Medication administration processes and systems – exploring effects of systems-based variation on the safety of medication administration in the UK National Health Service*.
- Navila Chaudhry has started a Health Foundation-funded Improvement Science PhD on *Using data and feedback to improve the quality and safety of prescribing*.
- Sara Yadav, Project Manager, was selected for a competitive talent development programme to enhance leadership capability of staff in professional services positions.
- Theme 3 had two successful awards of higher research degrees to theme fellows – one on the psychological impact of complications on patients and surgeons (PhD, September 2013), and one on the role of mid-level managers in enhancing patient safety in hospitals (PhD, July 2013). Both graduates are currently employed as postdoctoral researchers within the theme, to solidify our capability and continuity.
- Theme 4 have had two successful awards of higher research degrees – one on a patient safety training intervention for Foundation Trainees (PhD, July 2013), and one on the use of simulation within interventional cardiology (MPhil, Jan 2014).
- Researchers from the Centre for Medication Safety and Service Quality (CMSSQ), associated with PSTRC through Professor Dean Franklin, continue to meet regularly with colleagues from the Centre for Infection Prevention and Management to present their research with a view to identifying areas of synergy and potential collaboration, exchange best practice and increase dissemination of findings.

We also carry out a considerable amount of training in the NHS Trusts around London which last year included:

- Northwick Park, July 2013, N=200+; *Human Factors and Teamwork in the Operating Theatre* (1 day session).
- Central Middlesex, October 2013, N=150+; *Human Factors and Teamwork in the Operating Theatre* (1 day session).
- Royal London, December 2013 and Feb 2014, total N=30; *Assessment of Teamwork in the Operating Theatre* (2 half day sessions).

Other training:

- Theme 4 Lead, Dr Sevdalis, is the training lead for the PSTRC. We have identified and made full use of NHR training opportunities for our trainees, including residential courses and summer schools, which we have been attended by PSTRC trainees on an ongoing basis (McLeod in 2013; Byrne and Johnston in 2014).
- We are putting together a proposal for a new joint RCA/Imperial Masters in Healthcare Design that will be targeted at students and professionals from a variety of backgrounds.
- HELIX designers have run a research afternoon and training session with students on the Imperial Masters of Health Policy Course.
- We will be running a range of different short courses and workshops for hospital staff over the next year.

**PSTRC**
7. LINKS WITH INDUSTRY (no more than two pages)

Theme 1 researchers and Dr Aylin have developed a relationship with Dr Foster Intelligence and adopted their published methodology in their analytics packages for NHS organisations (e.g. stroke indicators).

The HELIX Centre has established formal partnerships with Stanford University Biodesign, TATA industries, IDEO. HELIX Centre staff recently returned from a visit to California where they formed links with senior staff at Google, Apple, Stanford Biodesign, IDEO and Kaiser Permanente.

Within Theme 3 we have a strategic collaboration with Sanofi Pasteur Pharmaceutical, through an unrestricted research grant obtained by Dr Sevdalis in 2012. The research focuses on understanding behavioural determinants of adult immunisation in the UK and internationally.

This on-going relationship is the basis for further work with the pharma industry in this area and has resulted in a collaborative project with RAND Europe, in which we reviewed published evidence and also market research data provided for the first time by a collaborative of pharma firms interested in vaccination research. The project, carried out by Sevdalis, was successful and led to a recent publication in the highly prestigious social science journal *Social Science and Medicine* (Yakub et al, Soc Sci Med 2014;112C:1-11). We are cultivating this relationship aiming to expand it in the future.

Within Theme 5, there are discussions under way with two medical technology companies who have each developed electronic/automated solutions for ward-based medication storage and administration, with a view to developing collaborative research to evaluate their patient safety implications.

Key challenges involve the differences in outcome prioritisation between academia and industry, which is resolved on an on-going basis through direct communication within the project team. Perceived conflicts of interests are fully and carefully disclosed on any dissemination outputs.

7.2 Please indicate the total number of UK Small and Medium Enterprises (SMEs) you have worked with during financial year 2013/2014 and provide brief details of key examples.

Theme 5 researchers are working closely with an SME software developer to design and develop multiplatform applications for point of care decision making for healthcare professionals and aspects of patient safety for patients.

7.3 Please provide details of: i) any new strategic partnerships between your Centre and industry during financial year 2013/2014 ii) the progress of ongoing strategic partnerships between your Centre and industry during financial year 2013/2014.

Dr Nick Sevdalis (theme 3 and 4) is in discussions with Sanofi Pasteur regarding further expansion of our collaborative work in the year 2014-15. This will be reviewed when the outputs of the previous year’s research become available and are evaluated internally within the firm.

7.4 Please provide brief details of key examples of studies active in financial year 2013/2014, as follows:

- Contract commercial trials
- Industry collaborative research studies
- Other academic commercial research

Two industry collaborative research studies:

- A qualitative interview study of 120 participants across six countries (UK, USA, France, China, India, Brazil)
- A quantitative survey-based nationally representative study of 2500+ participants across 3 countries (UK, USA, France).

The key research question for both studies is to identify the behavioural and attitudinal determinants of adult immunisation.

7.5 Please provide the number and key examples (including names of funder/grant schemes) of any partnerships or studies with industry which have led to further industry, public or charity research funding, including as part of consortia.

N/a
7.6 Please provide the number of Agreements signed with industry during financial year 2013/2014 and provide brief details of key examples, as follows:

- Non-Disclosure Agreements
- Model Trial Agreements including mICRA and mCTAs

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<th>Number of agreements signed with industry:</th>
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<tr>
<td>Non-Disclosure Agreements</td>
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<td>Model Trial Agreements including mICRA and mCTAs</td>
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We have signed a non-disclosure agreement on a new project within Sanofi Pasteur (unrelated to those above), in which we advise on the development and delivery of a survey-based attitudinal instrument to assess behavioural determinants of immunisation uptake of a vaccine for herpes zoster (shingles).
8. LINKS WITH OTHER NIHR INFRASTRUCTURE (no more than one page)

We engage on a regular basis with Greater Manchester PSTRC and have representation on each Advisory Board: Professor Bryony Dean Franklin on behalf of Imperial PSTRC and Professor Stephen Campbell for Greater Manchester PSTRC.

At the implementation end of the research spectrum, we have developed collaborative relationships with the NIHR CLAHRC for North West London, focused upon quality improvement research and evaluation. We successfully applied for CLAHRC Round 2 funding to support the development of an initiative run in collaboration with Imperial Healthcare NHS Trust to develop a quality monitoring and feedback system for anaesthetists. With the support of the CLAHRC NWL quality improvement model, the initiative was implemented trust-wide in 2013. The evaluation of this initiative was the subject of a grant from the NIHR HS&DR programme, due to report in 2014 and with broad collaboration with a number of key stakeholder groups for the development of quality measures in anaesthesia and clinician revalidation, including the Royal College of Anaesthetists and the National Institute for Academic Anaesthesia.

Building upon our partnership with CLAHRC NWL, we successfully made a joint bid for two Improvement Science PhD posts, funded by the Health Foundation and jointly supervised by academics from the PSTRC and CLAHRC NWL.

Professor Franklin is leading a theme in the NIHR Health Protection Research Unit in Healthcare Associated Infections and Antimicrobial Resistance which started April 2014, focusing on innovations in behaviour change, technology and patient safety to improve infection prevention and antimicrobial use, providing further opportunities for collaboration. Within this theme we will also explore the utility of adopting patient safety approaches to the prevention of healthcare associated infection and antimicrobial resistance.

Professor Darzi is one of the clinical leads for the Diagnostic Evidence Co-operative (DEC) London, one of four national centres of expertise funded by the National Institute of Health Research and led by Professor George Hanna, Head of the Division of Surgery. Professor Darzi is leading the Gut Health theme and Professor Charles Vincent is maintaining his links with the DEC as our Patient Safety Theme Lead. The overall aim of this Centre is to develop world-class methods for Point of Care (POC) diagnostic test validation and facilitate efficient integration of these technologies into clinical practice.

Professor Ara Darzi continues to lead Surgery and Technology theme for Imperial NIHR BRC and is also a recipient of the NIHR Senior Investigator award.

We are in discussions around running a joint researchers’ event for Imperial and Greater Manchester PSTRC later in 2014.
9. IMPACT IN HEALTHCARE PROVISION (no more than one page)

**Theme 1.** Our evidence on elective surgery by day of the week and the subsequent media interest was cited as a key driver in the NHSIQ policy (as reported in section 3 and 4). Our earlier paper on increased mortality in patients admitted at weekends is also cited in the NHS England paper ‘The evidence base from the urgent and emergency care review’. Our research methods were used as the basis of the Dr Foster produced Hospital Guide, which further raised awareness of potential problems in out-of-hours care.

**Theme 3.** The MySurgery app that has been developed is based on previous research within this theme, which identified areas where patients lacked information and/or understanding regarding what to expect and how to interact with HCPs when coming into a hospital to undergo surgery. This is a new development, which if successfully evaluated further in the coming year (2014-15) has potential to reach and impact large numbers of NHS surgical patients.

**Theme 4.** Instruments developed within this theme are now in use in NHS Trusts to evaluate the effectiveness of their surgical team interventions (e.g. Royal London and Heart of England NHS Trusts). Regular (annual) team and safety interventions have been rolled out to the NHS (e.g. North West London NHS Trust, ‘Safety, leadership and innovation in colorectal surgery’ course (SLIC)).

The ‘Anaesthesia morbidity and mortality meetings: A practical toolkit for improvement’ that we produced was disseminated in October 2013 to all departments of anaesthesia in the country and is the suggested resource for running M&M meetings.

**Theme 5.** To improve feedback provided to doctors on their prescribing errors, we developed and introduced a three-part intervention based on our research on prescribing errors and barriers to feedback (as above). Our interventions centred on increasing prescriber identification, improved individual feedback and group feedback, and were introduced at one hospital site with a second acting as control. Following evaluation, the approach has been rolled out across ICHT plus a second local NHS Trust. An implementation toolkit has been produced and widely requested, with many other trusts considering a similar approach.

Please also describe examples of work which has significant potential to improve patient outcomes or experiences in the future, setting out how the Centre plans to ensure that these potential benefits are achieved.

**Theme 2.** Working with the Cabinet Office Behavioural Insights Team we have recently completed a study investigating the format of different text messages on patient later attendance at out-patient clinic (currently up to 20% of patients miss their appointments). It is expected that the study will be published and widely disseminated.

**Theme 3.** In the 2nd and 3rd quarters of 2013, we carried out an expert review of patient involvement practices within Imperial College Healthcare NHS Trust, which directly involved patients of the Trust. The review identified areas of good practice and also areas where simple interventions have potential to improve the smoothness of patient journeys and overall patient experience. The results were summarised in a report, which was reviewed further by the PSTRC Management Board. The report is now being finalised for submission to the nursing and patient experience leads of Imperial Trust.

**Theme 4.** In 2013, we produced a novel version of the WHO Surgical Safety Checklist for use within Imperial College Healthcare NHS Trust. This was based on in vivo observations of how the Checklist is being used within our Trust’s theatres and also designer input so as to maximise the user-centredness of the Checklist. The revised Checklist was successfully piloted in June 2013 – and we are now going through the governance channels of the Trust to ensure approval of the revisions and implementation across surgical services within the Trust.

**Theme 5.** Findings from the IMPRESS study will provide the basis for a future application to the NIHR HS&DR or RfPB funding streams for full evaluation of one or more of the interventions developed, which we believe will lead to significant potential benefits in the future.
10. OTHER COMMENTS (no more than one page)

| Please use this space to provide us with any other information you would like to highlight, or comments you would like to make. |
| As well as supporting work funded directly via the PSTRC award, we believe this funding has also been invaluable in leveraging further funding. |