



**East Midlands Research into Ageing Network (EMRAN) Discussion
Paper Series**

ISSN [2059-3341]

Issue 5, September 2015

**Health care for older people research
in Nottingham and Derby**

Excellence in care through world class research

Professor John Gladman^{1, 2, 3, 4} Professor Tahir Masud^{2, 1} Professor Rowan Harwood^{2, 1} Professor Opinder Sahota^{2, 1} Professor Pip Logan^{1, 2} Professor Avril Drummond⁴ Associate Professor Adam Gordon^{1, 3} Associate Professor Sarah Goldberg⁴ Associate Professor Adrian Blundell^{2, 1} Assistant Professor Kate Robertson^{5, 1}

East Midlands Research into Ageing Network (EMRAN) is a research collaboration across the East Midlands to facilitate collaborative applied clinical research into ageing and the care of older people. EMRAN was set up with support from NIHR CLAHRC East Midlands.

Address for correspondence: Professor John Gladman, University of Nottingham, School of Medicine, Division of Rehabilitation & Ageing, Queen's Medical Centre, Nottingham. NG2 7UH. Email: john.gladman@nottingham.ac.uk

¹ University of Nottingham, School of Medicine, ² Nottingham University Hospitals NHS Trust, ³ Derby Hospitals NHS Foundation Trust, ⁴ University of Nottingham, School of Health Sciences, ⁵ Nottinghamshire Healthcare NHS Trust



Health care for older people research in Nottingham and Derby

Excellence in care through world class research

Table of Contents

Foreword.....	4
1 What we do	5
2 Our research topics.....	5
3 How we work	5
4 Who we are	5
5 Find out more	6
6 The health care of the residents of care homes	7
6.1 Medical Crises in Older People care home workstream.....	7
6.2 Optimal study	8
6.3 The LPZ and United Kingdom Care Homes (LaUnCH) study	8
6.4 The Proactive heAlthcare for older people in Care Homes (PEACH) study	8
6.5 Rehabilitation for outdoor activity and mobility (ROAM) in care homes	9
7 People with delirium and dementia, and their families	10
7.1 Better Mental Health and Medical Crises in Older People workstream.....	10
7.2 Developing an educational resource from a documentary of a specialist ward for people with delirium and dementia	11
7.3 Preventing falls in people with dementia: The Promoting Activity, Independence and Stability in Early Dementia (PRAISED) study	11
7.4 Communication training for hospital staff caring for people with dementia (the VOICE study).....	12
7.5 Services for people with dementia in rural areas.....	12
7.6 End of life care for people with dementia in care homes	12
7.7 PERFECTED (Peri-operative Enhanced Recovery hip FracturE Care of paTiEnts with Dementia).....	13
8 The aged musculoskeletal system: fractures, bone health, falls, exercise and sarcopenia.....	14
8.1 Prevention in fall in care homes (FinCH)	15
8.2 Chair based exercise	15
8.3 Engaging older people in long term exercise	15
8.4 The Physical activity Implementation Study In Community-dwelling AduLts (PhISICAL) study	16
8.5 Novel non-invasive techniques to measure mass, synthesis, and breakdown.....	16
8.6 Perindopril and Leucine to improve muscle function in older people. (LACE Study)	16
8.7 Intravenous iron after hip fracture surgery	17
8.8 Care of people with vertebral fractures.....	17
8.9 Intranasal drug delivery development	17
8.10 Osteoporosis and Falls Collaboration between Nottingham and Denmark	17
8.11 SARCOFALLS.....	18

8.12 Community Based Rehabilitation after Knee Arthroplasty (CORKA).....	18
8.13 Does occupational therapist led home environmental assessment and modification reduce falls among high risk older people?	18
9 Community services.....	19
9.1 Community hospitals.....	19
9.2 Promoting resilience in older people	19
9.3 Occupational therapy intervention for people who receive homecare re-ablement services: A mixed methods study.	20
10 Education and training.....	21
10.1 Undergraduate medical curriculum	21
10.2 Innovation and computer aided learning	21
10.3 Developing a curriculum for advanced nurse practitioners specialising in frail older patients	22
11 Medical Crises in Older People programme	23
12 Patient and public involvement in our research	24
12.1 Patient and Public Involvement in Research group	24
12.2 Lay members on research teams	24
13 Research capacity building	25
13.1 Centre for Doctoral Training in Rehabilitation and Healthcare Research.....	25
13.2 Current research fellows and students	25
14 External research links	27
14.1 The Birmingham / Nottingham MRC/ARUK Centre for Musculoskeletal Research (CMAR)	27
14.2 NIHR CLAHRC East Midlands	27
14.3 East Midlands Academic Health Sciences Network (AHSN).....	27
14.4 East Midlands Research into Ageing Network (EMRAN)	27
14.5 Overseas universities	28
15 Acknowledgments.....	29
16 Appendix – summary of our current portfolio of work	30

Foreword

It is with pleasure that I present this brochure of the work of the Nottingham and Derby Health Care of Older People Research Group. This brochure presents an overview of the research this group has done and is conducting. 2015 has been a great year for the group in which years of hard work has paid off and the group is advancing from strength to strength: in this year there was academic expansion as Adam Gordon was appointed to an Associate Professor post in the University of Nottingham School of Medicine at Derby and three large research grants were awarded this summer (the PEACH, PrAISED and FinCH studies).

The need for our research has never been greater. The welcome rise in life expectancy has an unwelcome accompaniment – an associated increase in the amount of time spent at the later stage of life with disability and illness. It is vital that we find ways to optimise well-being in this phase of life through prevention, treatment or amelioration. Fortunately, the opportunities have never been greater. There has been markedly increased investment in research into the ageing process (such as the Centre for Musculoskeletal Ageing across the Universities of Birmingham and Nottingham) and investment in research into the delivery of health care for older people (in particular in the NIHR CLAHRC East Midlands).

I expect and hope that this brochure will soon be out of date, as more PhD students join us, as more research grants are awarded and as our contribution to the health care of older people accumulates. For up to date information about the work of the group, please take a look at our website (<http://www.nottingham.ac.uk/research/groups/healthofolderpeople/index.aspx>)

John Gladman

1 What we do

This multi-disciplinary group delivers world class applied health research into the health care of older people, particularly those living with frailty, thereby supporting the best possible health care for these people in practice.

2 Our research topics

We describe our research in these five overlapping and closely-related topic areas:

- The health care of the residents of care homes
- People with delirium and dementia, and their families
- The aged musculoskeletal system: fractures, bone health falls and exercise
- Community services for older people
- The education and training of staff in the care of older people

See our web page that lists current and previous studies:

<http://www.nottingham.ac.uk/research/groups/healthofolderpeople/projects/index.aspx>

3 How we work

To produce the very best research:

- Our work is multidisciplinary – across the range of health disciplines and collaborating with a range of academic disciplines
- Patient and public involvement in our research is central

To maximise the impact of our research upon the health of older people

- We value close links to clinicians in the NHS
- We value close links to regional, national and international health organisations and charities
- We drive our research findings into professional training
- We drive our research findings into practice

To develop local, national and regional abilities to pursue excellence in care through world class research

- We have established the Centre for Doctoral Training in health care research to provide world class research training aimed particularly at health care clinicians

4 Who we are

Our research is a result of collaboration between many institutions with an interest in the health and well-being of older people. At the core they comprise:

- The University of Nottingham (the School of Medicine in Nottingham and Derby and the School of Health Sciences)
- The Nottingham University Hospitals NHS Trust
- Derby Hospitals NHS Foundation Trust
- Nottinghamshire Healthcare NHS Trust

Senior academics who lead the group are:

- Professor John Gladman^{1, 2, 3,4}
- Professor Tahir Masud^{2,1}
- Professor Rowan Harwood^{2,1}
- Professor Opinder Sahota^{2,1}
- Professor Pip Logan^{1, 2}
- Professor Avril Drummond⁴
- Associate Professor Adam Gordon^{1,3}
- Associate Professor Sarah Goldberg⁴
- Associate Professor Adrian Blundell^{2,1}
- Assistant Professor Kate Robertson^{5,1}

¹ University of Nottingham, School of Medicine

² Nottingham University Hospitals NHS Trust

³ Derby Hospitals NHS Foundation Trust

⁴ University of Nottingham, School of Health Sciences

⁵ Nottinghamshire Healthcare NHS Trust

The group works closely with The Centre for Dementia, Institute of Mental Health (University of Nottingham and Nottinghamshire Healthcare), particularly Professors Tom Dening, Martin Orrell and Justine Schneider

Professor John Gladman



5 Find out more

For more information on the work of the group and all the studies mentioned in this document, please visit our group's webpage

<http://www.nottingham.ac.uk/research/groups/healthofolderpeople/index.aspx>

6 The health care of the residents of care homes

In 2009 we reported that care home medicine was “coming in from the cold”, having been overlooked even by specialists in the health care of older people. This is partly because in 2008 we commenced the Medical Crises in Older People (MCOP) research programme (2008-2013) in which one of its three workstreams was dedicated to health care in care home residents. This work reviewed the world literature on the topic, surveyed the health and needs of people in care homes, and examined the details of how health care is delivered in care homes. This work also allowed us to develop a wide collaborative network of care home practitioners, most notably a leader of care home managers, Mrs Anita Astle MBE.

During and since the MCOP work our group has worked with other leading groups and researchers in this field, most importantly Professor Claire Goodman (University of Herts), on the “Optimal” study to evaluate models of health care delivery for care home residents, and the ProactivE heAlthcare for older people in Care Homes (PEACH) study to implement and evaluate best practice in health care in care homes.

Another important programme of work related to this topic is with the NHS Patient Safety Collaborative for the East Midlands to promote and evaluate the consequences of implementing safety and quality promoting tools developed by colleagues in the Netherlands - the LPZ and United Kingdom Care Homes (LaUnCH) study.

Some of our work focussing on falls prevention also considers the residents of care homes – this is described under the section about the aged musculoskeletal system.

Associate Professor Adam Gordon leads the work in this topic for the group.



Associate Professor Adam Gordon

Further details of all the studies listed here are found on our group’s website:

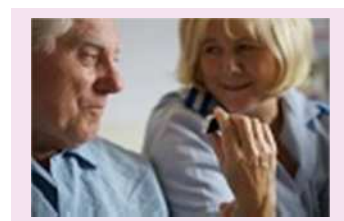
<http://www.nottingham.ac.uk/research/groups/healthofolderpeople/index.aspx>

6.1 Medical Crises in Older People care home workstream

This work, conducted between 2008 and 2013, was funded by a prestigious NIHR Programme Grant for Applied Research.

Our literature review showed that there is a vast amount of research that is specific to the health care of care homes - over 220 randomised controlled trials. We argue that there is enough of an evidence base for care home medicine or care home practice to be recognised as a specialty in its own right, and our aim is that those who provide care in care homes will find our effort to collate all this evidence of value.

Our survey of care home residents showed clearly that the residents of care homes are very frail: they have multiple conditions, they are on many drugs, they are very disabled, and most have cognitive impairment. Although these homes are their homes and are not hospitals, the residents are not a



group of fit older people simply receiving board and lodgings, but a group with complex and demanding needs.

Our study of the way that health care is delivered to the residents of care homes showed how vital the triangle of the resident and family, care home manager and GP is. Care home managers are essential advocates for the residents. GP are often the gatekeepers for a range of services. The skills of and relationship between these people are critical to successful health care.

6.2 Optimal study

This work, running between 2012 and 2016 is funded by the NIHR Health Services and Delivery Research Programme is in progress. The principal investigator is Professor Claire Goodman, University of Hertfordshire: Professors Justine Schneider, Tom Denning, John Gladman and Associate Professor Adam Gordon are co-applicants.

It began by synthesising all that we know about health care delivery in care homes. This complex review made a number of conclusions. One conclusion is that we have no further need for more surveys of the needs of the residents of older people: we need to be evaluating models to find out what works best for whom and why.



The review has also proposed that there are three main organising principles for effective health care services for care home residents: good health care is achieved by the delivery of specific services skilled in the needs of frail older people; good health care is a product of adequate incentives and sanctions, their monitoring and their governance; and services that focus upon fostering and supporting the relationship between care home and the health

services engender good health care. Although these notions are not mutually exclusive, we are aware that different models of health care services across England tend to apply these principles to a greater or lesser extent. The later phase of the Optimal study is to study carefully chosen services that demonstrate one of these three notions to see if we can determine which of them seems to be the most effective and efficient.

6.3 The LPZ and United Kingdom Care Homes (LaUnCH) study

Currently in the UK we have no reliable mechanism for measuring the prevalence of common care problems across care homes and hence no consistently recorded objective measure to drive, or measure, the impact of quality improvement initiatives in the sector. The International Prevalence of Care Problems (LPZ) tool was developed for this purpose in the Netherlands and is now implemented across many parts of mainland Europe. The aims of the LaUnCH project are to establish a mechanism for measuring, recording, analysing and sharing prevalence of common care problems in care homes across the East Midlands, and to identify and describe how such benchmarks can be used to drive quality improvement work and improve patient safety work. We will start this journey by implementing the International Prevalence of Care Problems (LPZ) tool in a sample of 30-35 care homes across East Midlands. This study is funded by the East Midlands Patient Safety Collaborative and led by Dr Adam Gordon.

6.4 The ProactivE healthcare for older people in Care Homes (PEACH) study

Health care is unstructured in UK care homes and allows unacceptable variation in quality. Local projects delivering structured and planned health care have improved outcomes but have not been sustained or implemented widely. This study will consider how to implement and sustain proactive health care in care homes through:

- A region-wide quality improvement (QI) to deliver proactive health care to care home residents
- A process evaluation of the QI programme and resulting changes to health care
- Measuring changes in Health-Related Quality of Life during the QI programme
- Costing health service use to consider cost-benefit

- Analysing records of hospital, GP and ambulance attendances to measure impact on health service use

On conclusion of the study we will be able to describe why and how other regions can implement similar improvements to deliver change at pace and scale. This study is funded by the Dunhill Medical Trust and led by Associate Professor Adam Gordon.

6.5 Rehabilitation for outdoor activity and mobility (ROAM) in care homes

The health and well-being benefits of being active and getting out of the house are well-known, and Professor Pip Logan in our group has led several research studies showing how occupational therapist can improve outdoor mobility in people who become housebound due to disabilities and illnesses. This PhD study aims to extend this work to the residents of care homes. The main aims of the PhD will be to design an intervention programme to improve the health and well-being of care home residents through outdoor mobility. The study is funded by CLAHRC-East Midlands and the PhD student is Amanda King, an experienced occupational therapist.

7 People with delirium and dementia, and their families

Our previous work to improve the hospital care of people with delirium and dementia and their families includes the “Better Mental Health” study (2008-2011) and a workstream of the Medical Crises in Older People programme (2008-2013), during which we developed our Patient and Public Involvement forum and valuable links with individuals who are part of our team, particularly Kate Sartain, Margaret Kerr and Maureen Godfrey.



Maureen Godfrey



Margaret Kerr



Kate Sartain

In the Medical Crises in Older People programme, we developed and evaluated a specialist hospital ward for people with delirium and dementia. We also developed a brief documentary about this ward, and this is now the subject of a further research grant to develop it as an educational resource.

We now link to wider work with colleagues in the Centre for Dementia the interests of which in the field of dementia are much wider, such as a study to define the effective components of community support for people with dementia, and a study to understand the barriers and drivers to providing and using dementia friendly community services in rural areas. We have worked with colleagues in Bradford to implement and evaluate a clinical intervention to prevent delirium in hospital. Our group now leads a programme of work aiming to prevent falls in people with dementia (the PrAISED study) and a study to develop and test a communication skills training intervention for healthcare professionals caring for people with dementia in acute hospitals (the VOICE study). Here we describe the studies that we have led or currently lead.

Professor Rowan Harwood and Dr Sarah Goldberg lead research in this topic.



Professor Rowan Harwood



Dr Sarah Goldberg

Further details of all the studies listed here are found on our group’s website:
<http://www.nottingham.ac.uk/research/groups/healthofolderpeople/index.aspx>

7.1 Better Mental Health and Medical Crises in Older People workstream

This work was undertaken between 2008 and 2013 and funded by the NIHR Service Delivery and Organisation, the Programme Research for Applied Research and Research for Patient Benefit Programmes. Our initial work demonstrated that there is a huge number of older people in hospital with delirium and dementia. We described in detail the breadth and complexity of their problems and needs, and also their tendency to poor outcomes. In response to this, we examined best practice in dementia care and used it

to develop a specialist ward for people with delirium and dementia, which we then evaluated in a research study. We found that patients managed in the specialist ward had a better quality of care and that their carers were more satisfied with their care. We saw no convincing effect upon outcomes such as survival or function (which were generally poor). An economic study suggested that the costs for the group in the specialist unit were lower largely due to slightly shorter stays in hospital and fewer placements in care homes. On balance, the unit was good value for money.



7.2 Developing an educational resource from a documentary of a specialist ward for people with delirium and dementia

The quality of care improvements seen on the specialist ward for people with delirium and dementia we studied in the Medical Crises in Older People programme were difficult to describe, but obvious to anyone who had visited the unit. We commissioned a short documentary of the unit 'Today is Monday'. This was produced by film maker Owen Davies and showed a 24 hour period on the unit and illustrated what good quality dementia and delirium care looks like in practice. The film has been widely disseminated, and during this process we felt that with a bit more work its educational value could be enhanced yet further. We then were awarded Alzheimer's Society funding to develop a series of educational on-line resources on the hospital care of people with dementia and delirium, using Today is Monday to illustrate good quality care. We are in the process of completing three resources: Dementia and Cognitive Loss, Person-Centred Care and Communication.

7.3 Preventing falls in people with dementia: The Promoting Activity, Independence and Stability in Early Dementia (PrAISED) study

The problems faced by people with dementia are many, but falls is one particular one that has been identified as a priority for research. Not only can falls cause, pain, injury, hospitalisation and even death, but for people with dementia some restrictive attempts to prevent falls could affect their liberty. Importantly, although there are good interventions to reduce falls in people who do not have dementia, these do not work or work so well in people with dementia.

Our work aims to understand why people with dementia are so prone to falling and hence what might be done to mitigate this risk. There are two key problems: people with dementia are particularly prone to falls because the dementia process itself affects movement and balance; and people with dementia find it difficult to participate, and maintain participation, in existing programme for fall prevention that rely heavily upon an intact memory. However, we also realised that with different types of exercises and new ways to deliver them, there is no reason why an effective intervention for people with dementia cannot be delivered.

These insights led us to develop, with patients, carers, falls experts, and dementia experts, a specific exercise programme for people with dementia. Not only do we hope it will prevent falls from occurring, but we hope that many of the other benefits to health and well-being will be seen, helping people to "live well with dementia".



This programme of work is now supported by a NIHR Programme Grant for Applied Research (PGfAR) award led by Professor Harwood and an Alzheimer's Society Clinical Training Fellowship, having been previously supported by an NIHR Programme Development Award, Nottingham University Hospitals NHS Trust Charitable Funds, Nottingham University Hospitals Flexibility Support Funding, Nottingham University Hospitals Research and

Innovation funding, and Nottingham City PCT and Nottinghamshire County Primary Care Trust Flexibility Support Funding.

7.4 Communication training for hospital staff caring for people with dementia (the VOICE study)

Successful communication between health care staff and patients and their families is central to safe, effective and high quality health care. Dementia often causes deficits that make communication difficult, and this requires health care staff to have greater communication skills. This project will define the most effective communications skilled required, develop a teaching package, put it into practice and assess its impact. This study is funded by the NIHR Health Service and Delivery Research Programme and runs between 2015 and 2018.

7.5 Services for people with dementia in rural areas

In recent years there have been major initiative to change the way that society is able to respond to the growing number of people with dementia- we are aiming for “dementia friendly societies” where people with dementia and those who care for them are not alienated, or even merely tolerated, but enabled to have meaningful lives and to contribute meaningfully to society. There are concerns that, despite the idyllic scenery of rural areas such as the English Peak District, the challenges to developing dementia friendly societies in rural areas are different from those in urban areas. I a study called “Scaling the Peaks; Understanding the barriers and drivers to providing and using dementia friendly community services in rural areas: the impact of location, cultures and community in the Peak District National Park on sustaining service innovations”, we will map the services and resources available to people with dementia and their carers, and examine how these are affected by the local geography. It will also study people with dementia in rural settings with a particular interest in the influence their locality, culture and community have upon their experiences and well-being. The study is a Research Fellowship funded by the Alzheimer’s Society and runs between June 2015 and May 2019.

7.6 End of life care for people with dementia in care homes

There has been increasing interest in improving the quality of care and experience during the dying process for those who die of conditions other than cancer. This is to share the excellence that developed in the hospice movement, particularly for those dying of cancer, to those dying of non-malignant conditions. The challenges of providing end of life care are slightly different for patients with frailty who follow a more uncertain trajectory towards death, and different again for those with dementia who may not be able to participate and express their autonomy fully. Many people with dementia end their days in care homes, which are their homes. Staff in the care homes are not just paid carers, but are often their surrogate families and they know their particular likes and needs. Yet too many people with dementia in care homes end their days being admitted to the unfamiliar surrounds of an acute hospital.



Dr Gillian Garden, a psychiatrist in Lincolnshire, with funding from a local charity, the Bromhead Medical Charity, developed and led an innovative service to train and support staff in aspects of end of life care in care homes in Boston Lincolnshire. The early results showed a marked reduction in hospital admissions from these care homes, and she is now rolling out this intervention in care homes across the county of Lincolnshire, with further charitable funding. Dr Garden is using this development as an opportunity to undertake a PhD to study this intervention in more detail, between 2015 and 2018.

7.7 PERFECTED (Peri-operative Enhanced Recovery hip Fracture Care of patients with Dementia)

People with dementia who break their hip are extremely vulnerable. This research programme is developing and piloting evidence based interventions to improve the hospital care of physical and mental health problems in people with dementia. The research programme will lead to the creation of an Enhanced Recovery Pathway (ERP) for the care and rehabilitation of people with dementia who break their hip. The main aims of the programme are to:

- Determine best practice in care using existing evidence and the perspectives of service users, carers, healthcare professionals, health service managers and recognised experts
- Define from best practice in care an optimised care pathway-the Enhanced Recovery Pathway
- Determine the training required to implement and maximise adherence to the Enhanced Recovery Pathway in hospital clinical settings
- Produce a manual to maximise adherence to the Enhanced Recovery Pathway
- Undertake a pilot study to assess feasibility of procedures and provide information to inform a definitive trial to investigate clinical and cost-effectiveness of the Enhanced Recovery Pathway

Professor Opinder Sahota is the Nottingham collaborator on this programme, which is led by Professor Chris Fox, University of East Anglia. The programme runs between 2013 and 2018.

8 The aged musculoskeletal system: fractures, bone health, falls, exercise and sarcopenia

Whereas the previous research topics concern an important setting for older people with frailty (care homes) and the problems of the aged brain (delirium and dementia), this research topic concerns another major health care topic seen in older people, the aged musculoskeletal system. By this we mean fractures, the underlying bone diseases that make the older bone susceptible to fracture, the underlying muscular weakness that predisposes to falls, and the falls that precipitate a fracture. Here we describe our studies with a physical focus, but many of our projects could be listed in more than one topic area (and some projects listed elsewhere could also be listed here).

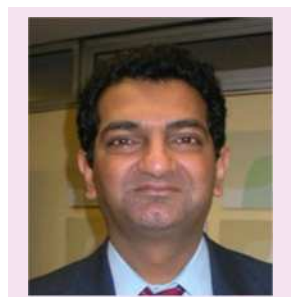
Our group has a long track record of falls research contributing to the evidence base for the benefit of interventions to prevent falls that now underpins routine clinical practice. Our previous studies have shown the benefits of cataract surgery to improve vision and reduce falls, and the benefits of community falls teams for people who fall but do not get sent to hospital. We have shown the limited value of attempting to prevent falls in people who are at risk of falling but have not yet done so, and we have also been part of a multicentre study that demonstrated the value of group exercises in fall prevention in the community. Despite this wealth of research evidence, the challenge of preventing falls is far from overcome. There are two important groups of people who have yet to benefit from research to prevent falls and these are people with dementia and the residents of care homes. For both these groups, existing interventions are ineffective or of limited value. In the delirium and dementia section of this brochure we describe our project to reduce falls in people with dementia, and here we describe our work to promote chair based exercise, and to prevent falls in the residents of care homes. Once research has shown the benefits of an intervention, it is also of great importance to put it into practice as quickly and as widely as possible so that patients can benefit. We also describe a project to do this (the PHysical activity Implementation Study In Community-dwelling Adults - PHISICAL study).

Falls cause both physical and psychological injury. Fractures are the major physical injuries from falling, and occur in older people not only because they fall but also because they have fragile bones – in most cases due to osteoporosis. One of the common and most serious fractures is hip fracture. We have a series of studies dealing with bone health and fractures, one of which, the PERFECTED study we have reported in the dementia and delirium section of this brochure because it is studying the care of hip fractures in people with dementia. We have previously completed a range of studies related to the in-hospital care of people with hip fracture (analgesia, hydration, and their discharge from hospital). Our current studies include a study of anaemia after hip fracture and a study of vertebral (spine) fractures, which are also important, painful and debilitating but which have hitherto often been overlooked.

The aged musculoskeletal system research in our group is led by Professors Pip Logan, Tash Masud, Opinder Sahota and Rowan Harwood.



Professor Pip Logan



Professor Tash Masud



Professor Opinder Sahota

Further details of all the studies listed here are found on our group's website:
<http://www.nottingham.ac.uk/research/groups/healthofolderpeople/index.aspx>

8.1 Prevention of fall in care homes (FinCH)

Our group has developed a range of decision support tools to help clinicians assess people who are at potential risk of falls and to guide them in what do to reduce these risks, based on the best evidence of effectiveness. These are the "Guide to Action" tools. The community version of the tool is in widespread use in community settings. There is also a care home version, but we realised that the efficacy of falls prevention has not been demonstrated robustly in care homes and so, before promoting this tool we decided to subject it to rigorous evaluation. We have completed a study (supported by the NIHR Research for Patient Benefit programme) to prepare for a large scale randomised controlled trial of the application of this tool, and this led us to work out how best to train and support staff as well as how best to recruit homes and residents and to measure their outcomes. We are now planning a large scale trial to test the implementation of care home version of the Guide to Action tool.



Kate Robertson

8.2 Chair based exercise

Whilst the benefits of various forms of exercise on health and well-being are becoming ever clearer, there are difficulties in very frail people being able to participate and benefit from doing so. Many exercise programmes require the participant to be able to stand or walk. For those that cannot, there is chair based exercise. This has been little studied. Our group has reviewed the literature briefly once and found little, and is repeating this review to look deeper. The first review was somewhat stymied by the lack of definition of chair based exercise, so we conducted a research study to get consensus among experts of what chair based exercise in their opinions should be.



We have used this work to develop a new, evidenced chair based exercise programme. We are doing initial field tests to confirm that our new programme works as intended, and we are also preparing to test it in a large scale study. Some of this work is being done as part of a PhD programme by Katie Robinson (a physiotherapist) and some is led by Professor Tash Masud, supported by the NIHR Research for Patient Benefit programme.

8.3 Engaging older people in long term exercise

Falls and the risk of falls has been shown to be reduced in older people living in the community if they complete regular lower limb strength and balance training. The NHS provides this training for a short period of time with the expectation that people will maintain the exercises after they leave the training programme. Research from this group has found that 40% of older people do not take up the prescribed training programme and of those who do complete the programme only 20% carry on with long term training.

We are now exploring why people do not attend the training programmes by collecting data from NHS services and from the patients themselves. Using the data and other published literature we will develop a number of strategies to increase the rate of attendance at the prescribed training and the ongoing exercises. The strategies will include emotional, behavioural, practical, environmental and psychological components. Once agreed these will be tried on the next group of patients referred to the strength

and balance programme. This work is being completed by Kevin Anthony as his PhD programme, supervised by Professor Pip Logan, Dr Tash Masud and Dr Kristian Pollock.

8.4 The Physical activity Implementation Study In Community-dwelling Adults (PhISICAL) study

The recent ProAct 65+ research study showed that the group-based Falls Management Exercise (FaME) programme was more effective in preventing falls than one-to-one exercise programmes. Nottingham and Derby together with London were the recruiting centres for ProAct65+, with Professor Tahir Masud being a co-investigator on this large multicentre trial led by Professors Steve Iliffe (London) and Denise Kendrick (University of Nottingham). There is now sufficient justification for these to be put into practice widely. Public health teams in Leicestershire and Derby are planning to implement FaME programmes. Many "implementation research" questions can be answered while this is done: what are the barriers and facilitators to put this into practice at scale and pace, and to retain effectiveness while doing so? This study is funded by the NIHR Collaboration for Leadership in Applied Health Research and Care (CLAHRC) East Midlands, and runs from 2015 to 2017.

There are many reasons why older people tend to fall, and in many people they are "multifactorial". But a major reason why people fall is muscular weakness. Sarcopenia is the word to describe the loss of muscle bulk and strength with age. There is much basic



science research taking place to work out why older people develop sarcopenia (i.e. lose muscle mass over time) and the contributions from decreased synthesis and increased breakdown of muscle. With a better understanding of these mechanisms, we can develop better inventions to prevent or reverse sarcopenia. We are involved in several studies in this area including a study to test simple techniques developed by colleagues in the University of Nottingham in Derby to measure muscle mass, synthesis and breakdown and a study led by the University of Dundee to test promising drugs and dietary supplements.

8.5 Novel non-invasive techniques to measure mass, synthesis, and breakdown.

At present, measuring muscle mass usually requires scans that have to be done in hospital, and measuring muscle synthesis and breakdown requires invasive laboratory experiments. Together, the difficulty of making these measures hampers research in this field. Colleagues in the University of Nottingham in Derby have developed non-invasive techniques in which muscle mass, synthesis and breakdown can be calculated by the take up and excretion of molecules that are used to make up muscle proteins. In this study, funded by the Abbeyfield Society, a PhD student will examine the use of this new technique in a range of people, of varying ages, some of whom are undergoing exercise regimes and hence are expected to synthesis muscle and some of whom will have a limb immobilised and so would be expected to lose muscle. If this technique proves to be successful, it can be used to test the effect of interventions to prevent or reverse sarcopenia targeting synthesis, breakdown or both.

8.6 Perindopril and Leucine to improve muscle function in older people. (LACE Study)

Despite the problems we have in measuring sarcopenia, some research to date using existing techniques have noted that a drug called perindopril (widely used to lower blood pressure and help in heart failure) is associated with less sarcopenia, and an amino acid called leucine is a food component that is particularly important in triggering muscle synthesis. There is sufficient reason already to test these out properly in a research

study to see if giving them to people with sarcopenia makes any appreciable difference. We already know that resistance exercise can prevent or reverse sarcopenia, but it is important to look for drugs and food stuffs that can also do so, either to be used in addition or instead of resistance exercise in those who are too weak to do resistance exercise. Professor Tash Masud leads the Nottingham arm of this study, which is funded by the NIHR and led by a study team in the University of Dundee by Dr Miles Witham.

8.7 Intravenous iron after hip fracture surgery

Anaemia following hip fracture is common. Approximately 30 to 45% of patients are anaemic on admission - 10% are severely anaemic. Anaemia is associated with poor outcomes with regard to mobility, postoperative mortality and readmission. There is currently no clear consensus on the optimal method of managing perioperative anaemia in this group of frail patients with frequent comorbidity. One approach is to give iron by injection – it is often not well tolerated or absorbed if given by mouth. This study will compare the outcomes of a group of 40 people after hip fracture surgery given intravenous iron to a group of 40 given usual hospital care. The primary outcome in this study simply looks at whether the iron injections increase the amount of blood synthesis in the week after the surgery, although other outcomes such as the need for transfusions, complications, mobility and mortality will be looked at. If the results are promising, larger trials, big enough to see if intravenous iron improves clinical outcomes, will be justified. Professor Opinder Sahota leads this study for the group.

8.8 Care of people with vertebral fractures

Osteoporotic spinal fracture is associated with significant pain, deterioration in physical function and leads to worse health care outcomes. Patients with these fractures who require hospital admission are frailer, older, in significant pain and have poor mobility. Treating their fracture needs to be done in conjunction with other age-related comorbidities, polypharmacy, cognitive impairment, sensory impairment and frailty. Orthogeriatric medicine brings together expertise in fracture management (invasive and non-invasive), peri-operative medicine, rehabilitation and bone health optimisation in a patient centred, co-ordinated multidisciplinary fashion. This has proven to be successful in the management of hip fractures and should offer the same benefits in spinal fractures. The aim of the research is to define a care model for the management of older people with osteoporotic spinal fractures in hospital. The study is conducted by Dr Terrence Ong, with support from a PhD Fellowship award from the Dunhill Medical Trust.



8.9 Intranasal drug delivery development

As part of a large grant by the Technology Strategy Board (in collaboration with Alan Perkins and Richard Pearson, University of Nottingham and Critical Pharmaceuticals), Professor Tahir Masud led the clinical trial aimed at developing a new intranasal route for the bone building drug teriparatide. This is the first "First in Man" trial conducted in Nottingham University Hospitals NHS Trust.

8.10 Osteoporosis and Falls Collaboration between Nottingham and Denmark

A collaboration between Nottingham and the University of Southern Denmark (funded by the municipality in Odense and the University of Southern Denmark) is led by Professor Tahir Masud who is supervising several PhD students investigating the prevalence of osteoporosis in people prone to falling, the usefulness of peripheral bone density in people who fall and the combination of whole body vibration and teriparatide in the treatment of osteoporosis. A further programme of research in collaboration with the University of Aalborg is investigating development of interactive gaming devices

including the Wii in balance and muscle strengthening programmes. Another study is utilising Danish databases to investigate if adding falls risk factors to FRAX (Fracture Risk Assessment Tool) improves fracture prediction (collaboration with Dr Stig Anderson, Aalborg University and Professor Nadeem Qureshi, University of Nottingham).

8.11 SARCOFALLS

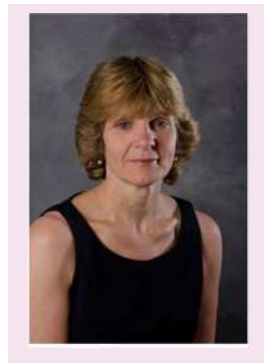
A recent area of research for the group is in the field of sarcopenia – the age related loss of muscle mass and strength. A study on the prevalence of sarcopenia in people who fall (SARCOFALLS), funded by NUH Charity, is led by Professor Masud.

8.12 Community Based Rehabilitation after Knee Arthroplasty (CORKA)

CORKA is a large multi-centre trial which is investigating the rehabilitation of those at risk of a poor outcome after knee replacement. In 2013, there were over 90,000 knee replacement procedures in the UK, representing a 7.3% increase over 2011, and this is continuing to rise due to an ageing population and other factors such as obesity. However although this is a routine procedure, around 15% of patients who undergo knee replacement surgery report they have continuing pain and mobility problems - a poor outcome – which limits or prevents them from being able to do activities they want to do. The study will investigate the effect of a multicomponent community based rehabilitation programme on such patients after knee replacement surgery (knee arthroplasty), and compare this approach with standard care rehabilitation programmes. The trial is led by colleagues at the Universities of Oxford and Warwick with Prof Avril Drummond from Nottingham.

8.13 Does occupational therapist led home environmental assessment and modification reduce falls among high risk older people?

Falls in older people are highly prevalent and are a major contributor to morbidity in the community. A significant proportion of falls in the community occur at home with many caused by simple hazards such as tripping over a rug or lack of handrails. Consequently relatively simple modification of home hazards could lead to a reduction in falls. Whilst there is some evidence that an assessment by occupational therapists can lead to a reduction in falls, this evidence is based on small trials. As a consequence routine home assessment by occupational therapists it is not widely undertaken among older people at



risk of falls. Thus the main aim of this trial is to establish whether environmental assessment and modification by occupational therapists will lead to reduction in falls among people at elevated risk of falling who are living in the community. The trial is led by colleagues in York with input from Oxford, Leicester, Sheffield, Australia and Prof Avril Drummond from Nottingham.

Professor Avril Drummond

9 Community services

The most important previous studies in this area were our two trials of different forms of “intermediate care” – short term rehabilitation to improve health and reduce the time spent in hospital. We studied a service that provided rehabilitation at home, and a service that did so in a care home. The home-based service led to better health outcomes, shorter lengths of stay and was good value for money, and this justifies the major role of home-based intermediate care services.

Whilst much of our research is community based, three current studies we list here are a study to evaluate the role of community hospitals in the care of older people, and a study to explore what community services are commissioned to promote the resilience of older people to help protect them from the ravages associated with ageing and disease.



Professor John Gladman leads the work in this area for the group.

Further details of all the studies listed here are found on our group’s website:

<http://www.nottingham.ac.uk/research/groups/healthofolderpeople/index.aspx>

9.1 Community hospitals

There are several hundred community hospitals in the UK, and such hospital are found throughout the world. Little research has been done into what they do, and whether there are any particular models or configurations that are particularly effective or efficient. This study uses econometric methods to examine a national audit database of community hospitals to identify the characteristics of apparently effective and efficient community hospitals, followed by case studies of examples of community hospitals demonstrating (or not demonstrating) these characteristics. The study is funded by the NIHR Health Service and Delivery Research Programme, and is led by a team from Bradford Teaching Hospitals NHS Foundation Trust and the University of Leeds.

9.2 Promoting resilience in older people

Much of our research work deal with mitigating the adverse consequences of old age such as by the use of rehabilitation. Whilst our group does not lead research to prevent the ageing process itself (but see our links to external partners), we are aware that it makes sense to also attempt to protect people from the effects of ageing and ill health. This study aim to identify what is being commissioned to support older people to maintain their resilience. By “resilience” we mean the ability to resist or bounce back from the challenges faced in older age (e.g. illness or bereavement). The sorts of services that we think are likely to enhance resilience are those that promote a healthy lifestyle in general (exercise, smoking cessation, alcohol control) but also those that help social aspects of health such as services to reduce loneliness. We also understand that these services can be delivered by the health services, the social services but also the “third sector” (e.g. charities). We also recognise that these services will only be of use if they reach the people for whom they are intended and work together as required in an integrated way. The SOPRANO study (Supporting Older People’s Resilience through Assessment of Needs and Outcomes, funded by the NIHR Collaboration for Leadership in Applied Health and Care Research (CLAHRC) East Midlands, is studying what services exist, how they are targeted and how they are integrated. We are particularly grateful for the support of the East Midlands Later Life Forum, via Andy and Moira Findlay, and Jo Smith.

9.3 Occupational therapy intervention for people who receive homecare re-ablement services: A mixed methods study.

Homecare re-ablement services have been developed by local authorities in England in response to the government agenda for health and social care. These services aim to optimise users' independence and ability to cope at home, and reduce the need for ongoing health and social care services. However, there is currently limited evidence on the configuration and delivery of re-ablement services. This study is a mixed methods study, with the overall aim to investigate whether an occupational therapy intervention can increase independence in personal activities of daily living in users of homecare re-ablement services. This study is being conducted by Phillip Whitehead under a NIHR PhD Fellowship award.

10 Education and training

Health practitioners of the present and the future need to be skilled in the care of older people with frailty – given the ubiquity of older people with frailty this is now a core skill and not something for specialists. The evidence base for the care of older people is rapidly advancing. As a group delivering a wide range of research, and sitting alongside schools of medicine, nursing and physiotherapy, our group is ideally suited to influencing undergraduate curricula in this area. Also as a group with a high number of clinical academics, we are well placed also to ensure that post graduate training and education is up to date and evidence-based.

We describe here work we have done to develop national and international curricula in geriatric medicine, and illustrate some of our innovative work including computer aided learning and the development of advance nurse practitioners.

Associate Professors Adrian Blundell and Adam Gordon have used their expertise in evidence-based practice and education to write the highly rated textbook "Geriatric Medicine at a Glance", published by Wiley (June 2015 ISBN: 978-1-118-59764-4).

This work is led by Associate Professors Adrian Blundell, Sarah Goldberg and Adam Gordon and Professor Tahir Masud



Associate Professor Adrian Blundell

10.1 Undergraduate medical curriculum

Back in 2007 we brought together a range of experts in biological, social and clinical gerontology to consider the specific knowledge and skill base required to deal with older people now and in the future, and we mapped this to the general guidance produced for the training of doctors in the UK by the General Medical Council (*Tomorrow's Doctors*) to produce a national undergraduate. We have since conducted two UK national audits of the delivery of this curriculum, helping medical schools across the country to prepare medical students better for their lives as doctors caring for older people. The Nottingham team led the development of the European Undergraduate Curriculum on Geriatric Medicine.

10.2 Innovation and computer aided learning

The challenges for medical education are that the number of students is rising, which potentially threatens the delivery of consistent teaching and training. The amount of information that could potentially be taught is overwhelming, and so care must be taken to control their exposure to the things they need to learn to be safe and to prepare them for modern practice. Computer aided learning packages are a means of providing enjoyable, consistent, well-defined, quality-assured teaching of the relevant knowledge base. Their use can mean that face to face teaching time is not used simply to pass on knowledge, but used to help students to apply that knowledge.

Our group has developed a suite of computer aided learning packages covering key topics such as delirium dementia, continence, activity, and prescribing. They are freely available for use by anyone, anywhere from our website <http://www.nottingham.ac.uk/medicine/study/learningresources/geriatricmedicine.aspx>.

We have shown in a number of studies that the use of these learning packages improves students' learning.

10.3 Developing a curriculum for advanced nurse practitioners specialising in frail older patients

Experienced nurses are beginning to take on some of the roles traditionally done by doctors. These nurses are called advanced nurse practitioners. Nottingham University Hospitals is one of the first places to train advanced nurse practitioners specialising in the hospital care of frail older patients. We have brought together experienced doctors, nurses, therapists and lay representatives to get expert agreement on a set of competencies and a role description for these roles. This work is being used as the basis of a curriculum for the training of these advanced nurse practitioners and will ensure consistent standards. The work is funded by Nottingham Hospitals Charity and led by Sarah Goldberg.

11 Medical Crises in Older People programme



The Medical Crises in Older People (MCOP) research programme was a major milestone in the development of our research group. It was funded by the NIHR's Programme Grants for Applied Research (PGfAR) programme. Planning began in 2006, the core funding was for £2m, and the programme ran for 5 years from 2008 to 2013. The overall idea behind this research (and much that has followed) is that application of the



principles of "comprehensive geriatric assessment" – a framework that typifies services for older people of proven benefit – to new settings is likely to be helpful. We chose three groups of patients who might benefit from this approach: older people using urgent care services in hospital; people with delirium and dementia in hospital; and the residents of care homes. We describe some of the work from this programme in other sections of this brochure.

The larger scale and longer duration of funding than we had received hitherto gave us the opportunity to develop our group. As well as producing 62 research papers (with more still to come) we:

- Supported seven PhD students, two of whom have won senior academic posts and are now research leaders in the group (Gordon, Goldberg)
- Developed a Patient and Public Involvement in Research forum, which continues to advise on our research and provide individuals to act as co-investigators in our study teams
- Developed productive links with Dr Simon Conroy in the University of Leicester. Dr Conroy led the acute care workstream of MCOP, and was appointed to an academic post as the programme began. This allowed us to strengthen the acute care work by conducting it in two sites (Nottingham and Leicester) and the legacy has been on-going collaboration, such as working with research trainees in Leicester
- Developed productive links with, and obtained great support from, local NHS research networks, which hold us in good stead still
- Developed productive links with the voluntary sector such as the Alzheimer's Society and Age UK, which also hold us in good stead still
- Innovated in terms of non-academic dissemination through the production of the "Today is Monday" documentary about the specialist hospital ward we developed and trialled as part of our research. This powerful and moving documentary is now being used in two on-gong projects to use it as an educational resource, one of which is described here
- Produced our own on-line journal the *Medical Crises in Older People Discussion Paper* series, which has published 16 papers. The website hosting this series also allows us to document the activities that lead to the impact of our research
- Were invited to develop an older people research theme in a NIHR regional research organisation CLAHRC for Nottingham, Derby and Lincolnshire (2008 to 2013) and to lead the Caring for Older People and Stroke Survivors theme of CLAHRC East Midlands (2014-2018)

The Medical Crises in Older People programme was led by Professor John Gladman.

See our web page at: <http://www.nottingham.ac.uk/mcop/impact/journals.aspx>

12 Patient and public involvement in our research

It is now an accepted truth that the quality of applied research is often improved where there is involvement of patient or people who represent them in the research team, alongside clinical and non-clinical researchers, and the service-level stakeholders who are also affected by the research. By “patients and public involvement” in research we do not simply using patients or the public as the subjects or participants of research. We mean involving them to help in all stages of the research process: choosing and explain research priorities; designing studies that will work in practice and respect the altruism of those who agree to participate; and helping in the conduct, analysis and dissemination of studies. They bring their own skills and resources from their lives and experiences, they require academics to avoid the jargon that can undermine rigorous thought, and many have a wide experience across many fields of research that can be illuminating.

Our group has considerable skill in the art of recruiting very frail patients and their families into research projects. But this group of people is usually very frail, and there are limits to how much they can truly contribute to the research process and how much is ethical to ask them to do so. What we have found is that amongst those who have cared, and do care, for them are knowledgeable and powerful advocates who welcome an opportunity to get involved in research quite simply to make the world a better place. Two areas illustrate how we have developed public and patient involvement in our research: our PPI group and our use of lay members on research teams.

12.1 Patient and Public Involvement in Research group

We have a wide network of patients and members of the public as we link into many local PPI groups and systems, such as CLAHRC-East Midlands and local NHS organisations. But in 2008 when we started our Medical Crises in Older People programme there were few such organisations and most were both overwhelmed and not focussed upon the care of older people. So we developed our own group. We used the contacts we already had and the group grew organically. We found that there were many people who wanted to engage in research but did not know how to, and they gradually coalesced around our group. The initial focus of the group was dementia care. We were fortunate to have a number of innovative research staff who led this work (Associate Professor Sarah Goldberg, Nadia Frowd and Pippa Foster) and for us to continue to have staff to maintain the working of the group (Dr Reena Devi and Dr Sam Bateman). The group’s main role is to be consulted at the early stages of research grant preparation – or later stages as required. Another role is to identify members of the group who would like to play a more significant role than mere consultation in each study. Several of the members of the PPI group have taken on such roles, and a few are described in the next section.

12.2 Lay members on research teams

It is often not sufficient for patient and public involvement in research to be limited to consultation, and in our work we welcome patient and public contributors to our research studies as co-applicants. We are pleased to have Kate Sartain as a co-investigator on our communication in dementia study, Margaret Kerr as a co-investigator on our hypertension in dementia (HIND) studies, and Maureen Godfrey as a co-investigator on our falls in dementia studies.

13 Research capacity building

The world needs a larger and sustainable research base related to the care of older people: the need for research is not going to go away anytime or anywhere soon! The process of developing the clinical academics of the future begins with giving undergraduates and young clinicians a taste of research, but starts in earnest with the development of post graduate researchers, usually through Masters and PhD programmes. We need clinical academics (people jointly trained as clinical practitioners and also as researchers) to perform applied health research, but clinicians have to undertake post-graduate clinical training to become expert in their discipline, as well as arduous research training, and this can be difficult. Historically the main opportunities to combine clinical practice and research have been available only to medical doctors, but clearly we need clinical academics drawn from across the range of clinical disciplines such as nursing and the allied health professions. Getting a PhD is not enough: the professional development of clinical academics, whatever their professional disciplines, after they have completed a PhD is also not simple. We have considerable expertise in identifying and supporting doctors, nurses and allied health professionals in this process. We describe here our Centre for Doctoral Training, designed specifically for supporting PhD students coming from a range of health care disciplines.

Professor Pip Logan and Associate Professor Sarah Goldberg lead in research capacity development for the group

13.1 Centre for Doctoral Training in Rehabilitation and Healthcare Research

We are proud of the Centre for Doctoral Training in Rehabilitation and Healthcare Research (CDT RHR). It is an unusual unit in that it provides PhD training for clinicians who seek part-time doctoral study alongside a clinical role. The CDT RHR host research in several areas, not only in the health of older people but also in translational and applied clinical research in stroke rehabilitation, long term conditions, and community rehabilitation. It offers tailored training suitable for people with a clinical background doing work in clinical settings. We provide access to clinical placements during the PhD studies, career development support during and – importantly – after graduation. The CDT RHR is a joint initiative between the Schools of Medicine and Health Sciences in the University of Nottingham.

13.2 Current research fellows and students

- **Fellowship:** Alzheimer's Society Post-doctoral Fellowship. Scaling the Peaks; Understanding the barriers and drivers to providing and using dementia friendly community services in rural areas: the impact of location, cultures and community in the Peak District National Park on sustaining service innovations. Dr Fiona Marshall.
- **Fellowship:** Alzheimer's Society PhD Fellowship. Developing a programme to reduce the risk of falls in people with dementia. Victoria Booth
- **Fellowship:** Dunhill Medical Trust PhD Fellowship. Management of osteoporotic vertebral fractures – Dr Terrence Ong
- **Fellowship:** NIHR PhD Fellowship. Occupational therapy in reablement services – Phillip Whitehead
- **PhD:** End of life for people with dementia in care homes – Dr Gillian Garden
- **PhD:** Hypertension in dementia – Dr Tomas Welsh
- **PhD:** Developing a chair based exercise programme for older people in community settings. Katie Robinson
- **PhD:** Rehabilitation for Outdoor Activity and Mobility: the ROAM study. Amanda King
- **PhD:** Does improved adherence to long-term exercise in older people reduce the rate of falls? Kevin Anthony
- **PhD:** Volunteers working with patients with dementia in the hospital. Liz Charalambous
- **PhD:** Communication and Dementia. Becca O'Brien

- **PhD:** Prevalence and natural history of patients with dementia who call out in the hospital. Jessica Beaver
- **PhD:** Development of an intervention to encourage the continuation of physical activity following a structured exercise programme for falls prevention. Sarah Audsley
- **PhD:** Non-invasive measurement of muscle mass, synthesis and breakdown. To be appointed.
- **PhD:** Use of hip precautions after hip replacement. Courtney Lightfoot.

14 External research links

Research in the care of frail older people is complex, and requires a wide range of skills and perspectives. Our core research group subtends a range of clinical disciplines, and in previous sections we have described some of our core partners such as the Dementia Centre in the Institute of Mental Health (University of Nottingham and Nottinghamshire Healthcare NHS Trust) and Dr Conroy and his team in the University of Leicester, and we have described how we bring the patient and public perspective into our research. In this section we briefly acknowledge other key local, regional, national and international linkages that help us to undertake research or to disseminate the findings and put them into practice.

14.1 The Birmingham / Nottingham MRC/ARUK Centre for Musculoskeletal Research (CMAR)

The Universities of Birmingham and Nottingham have world-renown research expertise in the ageing process, and with Medical Research Council and Arthritis Research UK support formed the CMAR. Professor John Gladman was part of the successful bid to these bodies. Whilst the strength of our research group is in applied clinical research into the care of older people, rather than in the ageing process itself which requires a life-course approach, this has enabled us to provide a translational research pathway for the findings of the CMAR into applied clinical research. The studies in our aged musculoskeletal research topic section demonstrate our potential to translate findings from bioscience into clinical science and practice.

14.2 NIHR CLAHRC East Midlands

CLAHRCs are regional research collaborations between NIHR-funded research groups and the universities, trusts and clinical commissioning groups in each region. They conduct applied health research. Professor Gladman leads the Caring for Older People theme, which is one of five themes in CLAHRC East Midlands, and which supports two studies listed here (SOPRANO and PHISICAL) and several PhDs.

14.3 East Midlands Academic Health Sciences Network (AHSN)

AHSNs are regional collaborations of trusts and clinical commissioning groups aiming to develop and improve the quality of health services, in particular through facilitating the application of research knowledge. Professor Gladman leads the Older People Living with Frailty programme which aims to put best practice in geriatric care (much derived from the group's research) into practice in hospital acute medical units and to prevent falls in hospital. Patient Safety Collaboratives (PSC) are NHS bodies linked to AHSNs, also with a regional organisation, to enhance patient safety. Associate Professor Gordon leads a project with the East Midlands PSC to put an internationally-developed quality assurance system into place in local care homes.

14.4 East Midlands Research into Ageing Network (EMRAN)

Launched and lead by Professor Gladman, and supported by CLAHRC East Midlands, this network aims to promote collaboration in the field of applied health research into older people across the East Midlands. EMRAN has also developed its own on-line journal the East Midlands Research into Ageing Network Discussion Paper Series, and Professor John Gladman, Associate Professor Adam Gordon, and Associate Professor Sarah Goldberg are among its editors. The first four papers published in this journal came from our group. EMRAN provides a network of other researchers, clinicians, commissioners, providers and the public across the East Midlands, which covers a population of 4.5m. For more information see the EMRAN website (<http://www.clahrc-em.nihr.ac.uk/clahrc-em-nihr/emran.aspx>) and the EMRAN Discussion paper site (<http://www.nottingham.ac.uk/emran/index.aspx>)

14.5 Overseas universities

We value the insights afforded by our friends working in universities in similar fields elsewhere. Examples are:

- Professors Jos Schols and Ruud Halfens from the University of Maastricht, Netherlands, who work with Associate Professor Adam Gordon on the LAUNCH study
- Professors Marcel Olde Rikkert and Rene Melis from the University of Nijmegen, Netherlands, who work with Professor Gladman on the SOPRANO study
- Associate Prof Maw Pin Tan from the University of Malaysia, who is working with Associate Professors Adrian Blundell and Adam Gordon on developing curricula in geriatric medicine for Malaysian doctors
- Professor Tahir Masud holds a visiting professorship in geriatric medicine at the University of Southern Denmark from which some of his collaborative studies on bone health and falls have emerged. Collaborators include Dr Jesper Rygg, Dr Lars Matzen, Dr Stig Anderson, Dr Martin Jorgenson

15 Acknowledgments

The core staff listed in this document could not have achieved so much without the collaboration of many other people and organisations. There are so many people that it is impossible to list them all, but some members of our research teams we would like to mention other than those already mentioned elsewhere are:

- University of Nottingham, School of Medicine : *Mrs Gail Arnold, Dr Veronika van der Wardt, Dr Neil Chadborn, Dr Gina Sands, Dr Tomas Welsh, Dr Reena Devi, Dr Sam Taylor, Professor Marion Walker, Professor Sarah Lewis, Professor Anthony Avery, Professor Denise Kendrick, Associate Professor Elizabeth Orton, Prof Amanda Griffiths, Dr Miriam Stanyon, Mrs Gail Arnold*
- University of Nottingham, School of Health Sciences: *Associate Professor Kristian Pollock, Dr Catherine Vass, Dr Victoria Hood, Dr Philip Clissett*
- University of Nottingham, School of Pharmacy: *Professor Rachel Elliott, Dr Lukasz Tanajewski*
- Institute of Mental Health: *Associate Professor Rob Jones*
- Nottingham University Hospital NHS Trust: *Dr Fiona Kearney, Dr Aamer Ali*
- Nottingham City Care: *Mrs Marie Ward*
- Alzheimer's Society: *Mrs Pippa Foster*
- University of Leicester: *Dr Simon Conroy, Dr Jay Banerjee, Mr Aidan Dunphy*
- PPI: *Margaret Kerr, Kate Sartain, Maureen Godfrey, Alan Caswell, Elizabeth Thraves, Kate Hodgett, Andy and Moira Findlay, Jo Smith, (and many others!)*
- East Midlands Research into Ageing Network (EMRAN): *Yvonne Simpson, Chris Craig*
- Centre for Musculoskeletal Ageing Research (CMAR) Universities of Birmingham and Nottingham: *Associate Professor Philip Atherton, Professor Paul Greenhaff, Professor Janet Lord, Associate Professor Carolyn Grieg*
- Enabling Research in Care Homes (EnRICH) Network – *Jo Greenwood, Claire Litherland, Kaela Stephenson, Amy Shuttlewood*
- Care homes: *Anita Astle MBE, Zimran Alam, Verity Hallam*
- Nottingham University Hospitals Trust, *Dr Rob Morris*

16 Appendix – summary of our current portfolio of work

More information about all of these studies (except those marked with *) can be found on our website:

<http://www.nottingham.ac.uk/research/groups/healthofolderpeople/projects/index.aspx>

PhD students and fellowships			
Student	Funder	Title	Supervisors (core group)
PhDs			
Tomas Welsh	British Geriatrics Society	Hypertension in dementia	Gladman, Gordon
Gillian Garden	Bromhead Medical Charity	End of life for people with dementia in care homes	Gladman, Gordon
Victoria Booth	Alzheimer's Society	Developing a programme to reduce the risk of falls in people with dementia.	Logan, Masud
Amanda King	CLAHRC EM	Outdoor Activity and Mobility: the ROAM study.	Logan, Gordon, Gladman
Kevin Anthony	CLAHRC EM	Does improved adherence to long-term exercise in older people reduce the rate of falls?	Logan, Masud
Katie Robinson	CLAHRC EM	Developing a chair based exercise programme for older people in community settings.	Logan, Masud, Gladman
Terence Ong	Dunhill Medical Trust	Management of osteoporotic vertebral fractures	Sahota, Gladman
Thomas Jackson (Birmingham)	Age UK and British Geriatrics Society	Delirium in general hospital as a marker of undiagnosed dementia: evaluation of pragmatic methods for screening and follow-up	Gladman
Ditte Jepson (Denmark)	University of Southern Denmark and Municipality of Odense	Whole Body Vibration in addition to Teriparatide in the treatment of osteoporosis	Masud
Katje Thomsen (Denmark)	University of Southern Denmark and Municipality of Odense	Osteoporosis and Falls in Odense Study	Masud
Liz Charalambous	Nottingham Hospitals Charity	Volunteers working with patients with dementia in the hospital	Goldberg, Harwood
Becca O'Brian	University of Nottingham, School of Health Sciences	Communication and dementia	Goldberg, Harwood
Jessica Beaver	CLAHRC EM	Prevalence and natural history of patients with dementia who call out in the hospital.	Goldberg, Harwood
Sarah Audsley	NIHR National School of Primary Care	Development of an intervention to encourage the continuation of physical activity following a	Logan

	Research	structured exercise programme for falls prevention.	
TBA	Abbeyfield Society	Non-invasive measurement of muscle mass, synthesis and breakdown	Gladman, Sahota, Masud
Phillip Whitehead	NIHR	Occupational therapy in re-ablement services	Drummond,
Courtney Lightfoot	University of Nottingham, School of Health Sciences	Use of hip precautions after hip replacement	Drummond,
Post-doctoral fellows			
Fiona Marshall	Alzheimer's Society	Scaling the Peaks; Understanding the barriers and drivers to providing and using dementia friendly community services in rural areas	Gladman
Research grants			
Investigators (core group)	Funder	Title	Duration
Gladman	NIHR CLAHRC EM	SOPRANO (Supporting Older People's Resilience through Assessment of Needs and Outcomes)	2014-2016
Gladman, Logan	NIHR CLAHRC EM	Implementation of the FaME (Falls Management Exercise) programme	2015-2017
Gladman	EM AHSN	Older People Living with Frailty	2014-2016
Gladman	NIHR HS&DR	An evaluation of community hospitals	2014-2016
Gordon, Gladman	NIHR HS&DR	Optimal models of health care in care homes	2014-2016
Gordon, Gladman	East Midlands PSC	LAUNCH	2015-2016
Gordon, Gladman, Logan	Dunhill Medical Trust	PEACH	2015-2018
Gladman, Logan, Gordon	NIHR RFPB	Hypertension in Dementia Feasibility study	2014-2016
Masud, Logan, Gladman, Gordon, Harwood	NIHR RfPB	Feasibility study of chair based exercise	2015-2017
Harwood, Goldberg	NIHR HS&DR	Communication skills training for healthcare staff caring for people with dementia	2015-2018
Goldberg, Harwood, Gladman	Alzheimer's Society	Compassionate Dementia Care in the Acute Hospital - Learning from the Documentary 'Today is Monday'	2014-2015
Harwood, Masud, Logan, Goldberg, Gladman	NIHR PGfAR	PrAISED (Promoting Activity, Independence and Stability in Early Dementia)	2015-2021
Sahota	NIHR PGfAR	PERFECTED (Peri-operative Enhanced Recovery hip Fracture)	2013-2018

		Care of paTiEnts with Dementia	
Sahota	National Academic Institute of Anaesthesia	Intravenous iron after hip fracture surgery	2013-2015
Logan, Robertson, Gladman, Gordon	NIHR HTA	Falls in Care Homes study (FinCH)	2015-2018
Drummond	NIHR HTA	Community Based Rehabilitation after Knee Arthroplasty (CORKA)	2014-2017
Drummond	NIHR HTA	OT Falls	2016-2019
Drummond	NIHR	Reablement	2013-2016