The decision to devote this edition of the Dental Mirror to research is timely given the recent Dental School submission to REF2014. The Research Excellence Framework (REF) is the process for assessing the quality of research undertaken in Higher Education Institutions across the UK. This assessment takes place every six years or so and has provided us with the opportunity to review our research activity over the past few years and consider our strategy for the future.

Since the last review in 2008, we have consolidated our research into two strong research groups, Community Oral Health and Infection and Immunity. This has ensured critical mass and interdisciplinary expertise within each area and has resulted in a significant increase in postgraduate doctoral students (16 doctoral degrees awarded), external funding (~£7M) and peer-reviewed publications over this period (>200). These have helped support and bolster areas such as Child Oral Health Improvement and Dental Instrument Decontamination, both of which feature as our REF2014 impact cases.

In the following pages we outline the work of the research groups and provide information on some of our other recent developments. These include the establishment of The Scottish Oral Health Research Collaboration and the work to create a Clinical Research Facility within Glasgow Dental Hospital and School.

 Hopefully, this issue of the Dental Mirror demonstrates the vitality of our research as we strengthen the close working between our research groups, our collaborations with the Research Institutes of the MVLS College and our links with other research groups at national and international level.
The overarching aim of the Community Oral Health Research Group is to improve population oral health and understand and address oral health inequalities. The work is conducted across the life course, from infants to older people. The group is led by Professor Lorna Macpherson and has 20 members, including clinicians, individuals from the disciplines of Dental Public Health, Health Services Research, Epidemiology, Statistics and Behavioural Sciences, together with postgraduate students. The nature of the group permits a multidisciplinary approach to addressing complex social, behavioural and biological factors underlying population oral health and inequalities. Since 2008, the research group has generated approximately £4M from funding bodies and has published around 100 peer reviewed papers.

The three key areas of activity relate to child oral health improvement, head and neck cancer epidemiology and the development and evaluation of interventions to improve the oral health of older people. Much of the work has informed recent national oral health policy, particularly the development and evaluation of the national Childsmile programme [www.child-smile.org], with significant international interest in the methodologies adopted. Dr David Conway leads the work on head and neck cancer, investigating its burden and risk factors (particularly related to socioeconomic factors) and also oral HPV infection, as well as clinical management, outcomes, and potential for screening opportunities. This work includes large international multicentre studies (ARCAGE/INHANCE). Our most recent area of research is focussed on improving the oral health of older people and reducing age-related and socio-economic inequalities in this population. This work is led by Dr Andrea Sherriff and is one of the major activity areas for the recently formed Scottish Oral Health Research Collaboration.

Our strategy over the next five years is to consolidate the work outlined above through ongoing development, implementation and evaluation of complex interventions. This includes epidemiology, systematic reviews and meta-analysis, and exploiting existing data sources and advances in data linkage capabilities to address key research questions relating to health impact and inequalities. We also aim to develop further our collaboration with the Institute of Health and Wellbeing within the MVLS College, particularly in relation to the health economics evaluation of our programmes.

Over the past few years we have collaborated with the Infection and Immunity Research Group within the Dental School to investigate behavioural and biological determinants of dental caries in children and we plan to expand our activity in this area, with further external collaboration, to study biomarkers of ageing from early childhood.

Recent Funding


**Conway DI, McMahon AD, Macpherson LMD, Gibson J, Bagg J.** Opportunities for Oral Cancer Screening research and training project. NHS Education for Scotland (2013-2016). £105,000.


The Infection & Immunity Research Group

The Infection and Immunity Research Group comprises a total of 25 clinicians, scientists and postgraduate students from diverse backgrounds, but all with a common interest in microbiology and immunology. The group is led and directed by Prof Gordon Ramage and Dr Shauna Culshaw, who over the past 5 years have developed a functional unit focussing on oral and systemic health. Located between Level 9 of Glasgow Dental School and the Glasgow Biomedical Research Centre (GBRC [Gilmorehill campus]) the group’s success over recent years is based on research output and income generation, which has enabled us to grow and expand. Since 2008, group members have published in excess of 130 peer reviewed manuscripts and generated over £3M in funding from government, research councils and industry. This has enabled us to strengthen the group, with the recent additions of Dr Chris Nile (Lecturer in Immunology) and Dr Marta Czesnikiewicz-Guzik (Clinical Senior Lecturer in Periodontology).

Some of the key interests from the group include periodontal disease and its links with systemic disease, including rheumatoid arthritis and cardiovascular disease. We have also linked up with the Community Oral Health (COH) Group to use the national Childsmile programme to investigate biological factors associated with caries in young children, and are now embarking on a similar partnership to understand oral disease in the elderly through a ‘Caring for Smiles’ initiative. This links with ongoing work investigating denture related disease and devising novel strategies of controlling oral biofilm infections.

The I&I Group’s strategic direction over the next 5 years is to maintain and strengthen the existing collaboration with COH and to build upon this through investigation of chronic diseases of an ageing population, specifically focusing on inflammation. We intend to investigate microbiological and immunological factors associated with oral disease in the young through to the elderly. This will be facilitated by embedding key I&I staff members within the GBRC to enhance research directed at understanding the regulation of immune response in the oral cavity and its contribution to oral and systemic disease. We will also continue to collaborate externally with national and international research groups on high quality and focused grant-funded research.
Recent Funding

**S Culshaw, G Graham & I McInnes.** The Sir Jules Thorn PhD Studentship. T cells and Teeth – what do oral mucosal T cells do in health and disease. September 2013-September 2016. £84,000.

**G Ramage & C Munro (Aberdeen):** Wellcome Trust Strategic Award in Medical Mycology and Fungal Immunology. Evaluating clinical outcomes to Candida albicans biofilm formation in candidaemia patients. Oct 2013-Sep 2016. £133,000.


**C Nile, S Culshaw & P Herzyk.** Wellcome Trust Institutional Strategic Support Fund (iSSF) Catalyst Fund. Integration of RNAseq and metabolomics to completely map the alpha 7 nicotinic receptor mediated signalling pathways in oral keratinocytes. Sep 2013 – Aug 2014. £18,760.


**M Dalby, K Burgess, G Ramage.** Engineering & Physical Sciences Research Council EPSRC. Multiscale topographical modulation of cells and bacteria for next generation orthopaedic implants. Aug 2013 - July 2016. £327,000.


**Diver D, Potts H and A Smith.** Glasgow University, GKE fund. Novel medical device aseptic cleaning and storage methods for efficient healthcare logistics. £20,838.

**Smith AJ, Lappin D & Watson I.** Assessing the efficacy and cost-effectiveness of detergents used in benchtop automated washerdisinfectors. (CDO Scotland) £20,000

**Smith AJ, Lappin D, Stewart A, Suttner N, Holmes S, Hill D, Sherriff A, Anderson E.** SIRN Reducing the risk of vCJD by improving the cleaning of neurosurgical instruments. £88,000

**A Smith.** Murihead I, Potts H, Diver D. Scottish Enterprise SMART scheme funding. Prototype development for ozone sterilization units for small medical devices. £TBC.

Infection & Immunity annual research away day at Mugdock Park (Aug 2013)
Dr Shauna Culshaw, Senior Clinical Research Fellow

“As the BSc neared completion, I was easily persuaded to apply for a funded PhD studentship working in this same research group. Three years, some sweat, blood and tears later I defended a thesis. Then I returned to finish dentistry, and to offset the culture shock, I sought some more research. A browse around the immunology journals identified the Forsyth Institute, Boston, as a leading institution in oral and dental immunology.”
Dr Alex McMahon, Reader in Epidemiology & Honorary Consultant in Epidemiology

How do you become an epidemiologist? Where to start? I originally went to the University of Glasgow to do a BSc Honours in Statistics. After University I went into industry with my first job being in the famous Medical Statistics department at Glaxo Group Research. We were based in the original art deco building in Greenford in London. My work was mostly based around clinical trials in Phase 3 to see if drugs could be proven to work properly and could then be licensed for worldwide prescribing. Patients now commonly use some of the drugs we worked on in those days.

My next position took me back to G12 but with a long commute down to an old mansion house in rural Lanarkshire. This was for a clinical research organisation that has since been merged and acquisitioned, but used to be called Data Analysis and Research Limited. This also involved working on randomised controlled trials for the pharmaceutical industry. By that time I had a few years’ experience under my belt and was getting interested in the more high level and complicated parts of study design and analysis. I started to wonder if contract clinical research was really challenging enough for me and maybe I should register for a higher degree of some sort, and maybe publish a couple of papers. It turned out that the Medicines Monitoring Unit at Dundee University needed a biostatistician to work on drug epidemiology projects and register for a part-time PhD. This sounded promising so I telephoned and ‘fessed up’ to not knowing anything about epidemiology as I had been working on clinical trials. That wasn’t a problem so I spent five years there, doing an on-the-job PhD on study design and analysis of pharmacoepidemiological studies.

My next job was at the Robertson Centre for Biostatistics here at the University of Glasgow. As well as doing epidemiological studies (some of them in dentistry with colleagues here at the Dental School) and clinical trials, I also managed the West of Scotland Statistical Advisory Service doing over 300 of the consultations myself.

University research is often amongst the most creative and interesting that you can get, and it can change clinical practice dramatically. Our studies are built from the ground up as well, without using much input from third parties, so researchers need to learn fast. I ended up moving over to the Dental School after nine years in the Statistics Department. My work now includes some teaching of postgraduates and supervision of PhD students and I have an honorary contract as a Consultant Epidemiologist with the NHS, which is all very different from what I did before.

“By that time I had a few years’ experience under my belt and was getting interested in the more high level and complicated parts of study design and analysis. I started to wonder if contract clinical research was really challenging enough for me and maybe I should register for a higher degree of some sort”
Oral healthcare costs the Scottish Government over £400m p.a., therefore research to improve oral health and oral health care delivery has significant population and fiscal benefits. The Scottish Oral Health Research Strategy, published by the Scottish Government in 2010 (http://www.scotland.gov.uk/Publications/2010/12/17131010/2) highlighted the potential advantage of research collaboration across the Scottish Dental Schools and primary dental care, in areas of common interest and strength. This has now been formalised through establishment of the Scottish Oral Health Research Collaboration, supported by an SFC-funded administrator (Lucy Dunbar) and with an over-arching theme of inequalities and oral health. A national Steering Group, chaired by the Chief Dental Officer, oversees three focused special interest groups in Dental Public Health / Health Services Research, Craniofacial Anomalies, and Dental Education Research. This approach broadens the skill base that can be applied to formulating research questions and tackling the big issues in the respective subject areas, with early success already achieved in gaining external grant funding. The resulting increase in critical mass of researchers in these areas of existing expertise provides an outstanding opportunity for delivery of world-class research through Scotland-wide collaboration. The programme is building on the major progress already made through Scottish Government programmes such as Childsmile (www.child-smile.org) to reduce inequalities, and includes oral health issues associated with inequalities in elderly care home residents and those with oral cancer. The extensive experience of researchers at Dundee Dental School in running large randomised controlled clinical trials complements the approaches used by the dental public health team in Glasgow. Cleft lip and palate also have an association with socio-economic status in Scotland and the research collaboration brings together experts in the genetics of this disease from Dundee and Edinburgh Universities with researchers in Glasgow who have expertise in using three dimensional imaging techniques to support the genetic studies. The Dental Education Research Group has only become established within recent months, but the collaboration between all the Higher Education Institutions in Scotland delivering dental education, NHS Education for Scotland and the University of Dundee Centre for Medical Education provides exciting potential for high quality research in this neglected area. Future issues of Dental Mirror will provide updates on progress and on the impact of this national research initiative.

Clinical Research Facility

Detailed planning is nearing completion for a combined research and teaching facility at the Dental School which will provide bespoke accommodation to support an expansion of clinical research activity, enhancement of postgraduate clinical teaching and an integrated basic life support training facility. Construction work is due to begin in January 2014. The plan below illustrates the format of the facility, which is being funded from a variety of sources, including the Glasgow Dental Educational Trust, NHS organisations and the University of Glasgow. The latter includes a contribution from the Dental Fund managed by the Development and Alumni Office.

The Clinical Research Facility will include a dental surgery, interview room and waiting area and will provide a much-needed resource to support the flourishing activities of both the Infection & Immunity and Community Oral Health Research Groups. Installation of audiovisual equipment will allow the Research Facility to be used as a postgraduate clinical teaching area when not in use by clinical researchers. The Basic Life Support Training Facility will incorporate an advanced SimMan robotic manikin, computer control room and floor space for resuscitation training.

A more detailed item will appear in a future issue, once the facility is completed in mid April 2014. Grateful thanks are due to Professor Chris Packard and Dr Roma Armstrong (NHSGGC R&D) and to Mrs Karen Murray and Mrs Frances McLinden (NHSGGC Oral Health Directorate) for moral and financial support.
It is clear that the Dental School has a flourishing research portfolio, but one might ask how this sits alongside the undergraduate teaching, and if indeed the undergraduate students can interact with the research. Through the elective projects students are given the opportunity to be involved and contribute to research activity. There has been a long history of such opportunity and there have been many benefits to students and researchers alike. With a shortfall in academic dentists, this is an essential means of introducing dental students to what other career paths exist. A recent elective student, David Treagus, carried out his project in the Infection and Immunity Group under the supervision of Dr David Lappin and Dr Chris Nile. During his elective period he investigated the molecular basis for the bi-directional link between Diabetes and Periodontal Disease. When asked about his experience David said:

“Research has always been something that has interested me, so when the opportunity arose… I couldn’t refuse. It was hard work, with a lot of background research required in order to get up to speed with current immunology. I gained an understanding of the research process, learnt new skills… Overall I’d recommend a research project to anyone interested in a future career in research”.

David’s work has been awarded two prizes - The British Society of Paediatric Dentists West of Scotland Branch elective prize and The British Society of Periodontology Frank Ashley Prize (awarded jointly with WanXin Luan (London)).
Whatever your profession, I’m sure at some point you have seen a pseudo-science news story in the headlines that has frustrated you, a story in which the original facts have been misinterpreted or worse, deliberately distorted to perpetuate a myth.

But have you ever concerned yourself with why the story was published, how the journalists got it so wrong and what you could do to bust the myth and improve the accuracy of science reporting? Strictly speaking, it’s not your job, but arguably it is in everyone’s best interest for the general public to have access to accurate scientific information. ‘Bad science’ in the national news breeds ignorance and fear of science amongst people, who in turn, influence government policy, which controls what research can be done.

Thankfully in the UK we now have an independent body, the Science Media Centre (established in 2002), which intervenes when science stories become ‘messy and controversial’ in the media. However, the situation remains that journalists are under ever increasing time-pressure to write up new science - and not all scientists are very good at interacting with the media.

Journalists are often regarded with scepticism and distrust, believed to have a different agenda, to have a pre-conceived bias, to be harsh critics and ask hard questions. But a good journalist is only doing what they can to get to the truth, to reveal facts which may be of interest or concern to the public, and playing ‘Devil’s advocate’ is just one of an array of tactics applied to do this. Just as peer review is habitually embraced by scientists, this form of feedback from the public communications arena should become widely accepted.

Understandably more difficult than learning to trust a journalist is for a scientist to find spare time for someone, outside of their academic circle, amidst a very hectic schedule. The most wise, most sought-after experts are likely, the most sleep-deprived. But here comes the good news – becoming more media savvy need not be time-consuming.

To start with, there is one simple thing you can do: be part of the media network. If you are an expert in a science discipline, sign up to the Science Media Centre database (you can e-mail a request) 1). You can then be contacted to provide a comment as part of a rapid response to a breaking news story or to help put new research into context. This will only happen if it is closely related to your area of expertise. Your knowledge will then be used to inform future media releases. Similarly, you should familiarise yourself with the Glasgow University Media Relations Team 2), who co-operate with both local and national news to maintain a strong science reputation for our College.

With your help, the news world will become a better, more scientifically correct place, and you should see fewer alarmingly inaccurate headlines.

1) www.sciencemediacentre.org
2) www.gla.ac.uk/news/media

About the author – Jessica is a final year Immunology PhD student at the University of Glasgow, funded by the EU consortium ‘Gums and Joints’ to investigate the potential link between periodontitis and rheumatoid arthritis.

When asked about her journey as a PhD student, Jessica told us -

“As I have progressed through my PhD, I have become increasingly aware of the value of effective communication in science: both between scientists in research development, and with the general public in delivering a clear message of the impact of research on health policy.”

Under the supervision of Dr Shauna Culshaw, Jessica has been encouraged to put her enthusiasm for science communication into practice. As a result of this support, she has invested time in a number of outreach projects, including the Glasgow Science Festival. The New Year will be marked by a new event in the outreach calendar. With the rest of the ‘Culshaw group’ of immunologists and microbiologists, Jessica will be presenting a set of activities at the Glasgow Science Centre, to help inform the public about periodontitis. The key message is: periodontitis is a disease of the gums caused by a particular group of bacteria that grow in layers known as a biofilm, and these bacteria present a challenge to the immune system. For three days in January and February, children will have the opportunity to build-their-own biofilm and carry it home in a petri-dish, as well as taking part in a re-enactment of the ‘battle in the mouth’ between the bad-breath bugs and the white blood cells. Meanwhile, curious adults can quiz the team about the research they do.

As part of Jessica’s interest in communication in science she has developed an interest into how media and science interact. In the following she provides us with an interesting insight into how we can become more involved in media interpretation and reporting of science.
I am sure from reading the preceding articles that you can see how exciting and vibrant the research environment is at Glasgow Dental School. For those of you who are alumni, we are holding a special event. The Dental School, in collaboration with the revitalised Dental School Alumnus Association, is hosting a Research Open Evening on Thursday 13th February 2014. It is an opportunity for those of you who want to discover more about the research that is happening at the Dental School to hear from individuals involved with and spearheading the research themes. There will be a series of short presentations to introduce you to the research and how it impacts upon our patients’ lives covering the exciting areas of childrens’ oral health, head and neck cancer, and the role of infection in oral and systemic disease, together with novel approaches to clinical management. Following these short presentations there will be an opportunity to speak with the post-doctoral fellows, PhD students and undergraduate students involved in the research day-to-day, where they will present posters detailing their work. There will also be an opportunity to meet old friends over canapés and a glass of wine. Some of you who live in the Glasgow area will have already received invitations.

However, if you live further afield and would travel to attend please let us know. You can contact Pamela Gibb in the Dental School (Pamela.Gibb@gla.ac.uk).

Places are limited and will be allocated on a first come first serve basis. We look forward to seeing some of you there.
On 9th December, Richard Welbury, Andrew Smith, John Gibson and Jeremy Bagg joined 19 University colleagues in a 24 hour Cyclothon billed as ‘Professors on your Bike’.

The event was organised by Alex Mackay, Administrator at the Wellcome Trust Centre For Molecular Parasitology, to raise funds to provide a community health worker and to paint the walls of the Baraka Children’s Clinic in the Mathare slum in Nairobi, Kenya. As an added attraction there was a 2hr ‘soakathon’ where selected Professors (including RW, AS and JB) were on exercise bikes outside and for a small donation people could ‘Soak a Prof’ with wet sponges or a Super Soaker.

This charity event raised £1,080, which will fund a community health worker at the Baraka clinic in Nairobi for a full two years.

Should you still wish to make a donation please contact: Alex Mackay alex.mackay@glasgow.ac.uk.

The cyclists included:

Professor Andrew Smith, Jeremy Bagg and Richard Welbury on their bikes!
Staff News

We would like to welcome the following new staff members who we have listed chronologically:

Marta Guzik – Clinical Senior Lecturer in Periodontology
Laura Short – Clinical University Teacher/Honorary Post CCST Orthodontic Trainee
Heather Gray – Hopscotch Research Co-ordinator
Fiona Morrison - University / NHS Liaison and Outreach Support Assistant
Suzanne Blacker - Clinical Senior University Teacher (Honorary Consultant)
Ranjith Rajendran - Research Assistant
Susan Wilkie – BDS 5 secretary (temporary)
Al Ross - Lecturer in Behavioural Sciences

We would also like to mention the departure of the following and wish them all the best in their endeavours:

Cailin Blackwood - University / NHS Liaison and Outreach Support Assistant
Khaled Ahmed, Noha Zoheir – Clinical Academic Fellows

Important Dates

Alumni Research Open Evening - Thursday 13th February 2014.

Henry Noble History of Dentistry Research Group - The Menzies Campbell Lecture will be delivered by Prof David K. Whittaker, OBE, BDS, PhD, FDS RCS, FRSA, on *Forensic Dentistry and Historical Investigations*. 18th March 2014, at Lecture Theatre 1, Glasgow Dental Hospital & School, at 5.00pm.”

Editorial Comment

Thank you for reading Issue 11 of the Dental Mirror. The editorial team want to thank everyone who has contributed to this issue. We hope you have enjoyed catching up on all that is happening. The next issue will have an Undergraduate focus and will update the readership on all the latest and most exciting news in teaching.