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ARC West Midlands News Blog

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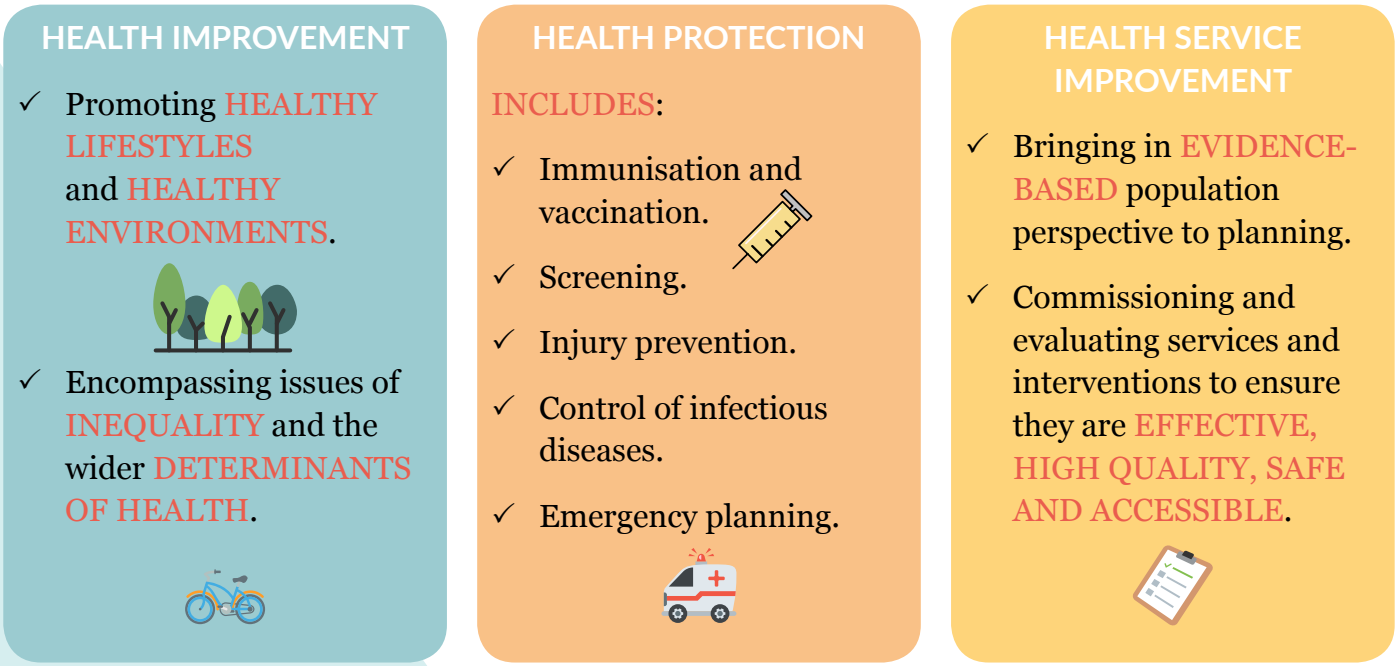

Figure adapted from [1]

Our New Public Health Theme

Prof Aileen Clarke (University of Warwick) – aileen.clarke@warwick.ac.uk
Prof Kate Jolly (University of Birmingham) – c.b.jolly@bham.ac.uk

Public Health, alongside Social Care, is one of the new cross-cutting themes in ARC WM, starting in early 2020 (see our previous news article, pp 27-8).

Public health is often defined as the science and art of preventing disease, prolonging life, and promoting health and wellbeing through the organised efforts of society (see FPH Strategy 2020-2025). It encapsulates three distinct domains (see above figure):

- **Health improvement**, which means promoting healthy lifestyles, healthy contexts and healthy environments, as well as tackling inequalities.
- **Health protection**, which means prevention, preparedness for, screening and response to infectious diseases and other threats to health.
- **Health service improvement**, which involves providing public health expertise to inform the effective and efficient planning and delivery of healthcare.

Public health feeds into every aspect of health and health care. Our unique selling point is that we take a population view.

Okay, so that's the background and definitions – what are we *actually doing in our theme?* Some stand-out projects are currently running in Warwick and Birmingham covering all three domains, alongside plenty of art and some science!!! We currently have 24 projects registered on our database of Public Health projects across our themes, including:

- A very large and wide-ranging network meta-analysis on primary prevention in cardiovascular disease, which is investigating a wide range of factors thought to be associated with cardiovascular disease morbidity and mortality. It is aiming to assess the factors that have the greatest influence. This work is being led by Dr Ola Uthman and funded by NIHR HTA, and the results will be of interest to the long-term conditions theme.
- Another large and international systematic review on factors affecting uptake of breast

cancer screening. A sneak preview suggests that ethnicity appears to be an important factor, as does higher social class in France! But watch this space…

- A new international project led by Dr Lena Al-Khudairy on developing standards for informed consent in screening for Public Health England, working with colleagues in Australia, New Zealand, Canada, the Netherlands and Scandinavia. This will be of interest to both the Acute Care Interfaces theme and Organisational Science theme.
- We have started two full systematic reviews regarding COVID-19, completing one in just a week and a half! Our review of droplet spread in resuscitation for the Resuscitation Council, has already been published though it was only started in April 2020.[2] The other is a review of Vitamin D and its influence on severity and outcomes in COVID-19. Both show that research on COVID-19 is still in its infancy, but will yield valuable insights in the months to come as we update them regularly.
- A prestigious, fully-funded post-doctoral career advancement fellowship held by Dr Amy Grove, which is looking at leadership in reducing variation in orthopaedic care, alongside Prof Graeme Currie, who leads the Organisational Science theme.
- A doctoral research fellowship held by Karoline Freeman, which is looking at real life use of testing to inform referral in primary care, and how traditional testing metrics on the quality of a test or on its cost-effectiveness do not begin to translate into the real life activities of referring GPs. This work will be of real interest to the Acute Care Interfaces theme.
- Work on an outreach intervention for homeless people in Warwickshire, which is being led by Paul Bird from the Research Methodology, Informatics and Rapid Response theme. With the advent of COVID-19 this study potentially offers an opportunity to track some of the impact of the "*Everybody In*" campaign that aimed to house rough sleepers during this period.
- A large trial of an assets-based infant feeding intervention, led by Prof Kate Jolly along with members of the Maternity theme.
- The Long-Term Conditions theme are undertaking research on the promotion of physical activity, and are developing a clinical pharmacist intervention to reduce opioid prescribing in primary care.

So our aim as a cross-cutting theme is to weave our work in with all the other ARC WM themes. We are working with the Research Methodology and Informatics theme on wellbeing in the workplace, and on behavioural interventions in COVID-19 messaging. We also have two projects starting up on social prescribing, which should weave in nicely to the Social Care theme. One is led by Dr Lena Al-Khudairy and is looking at the Social Prescribing link worker model and how routine data can be used to evaluate that model; while the other at Birmingham is an evaluation of social prescribing involving Prof Kate Jolly.

We have other research projects that encompass work with the Maternity theme and look forward to working with the Integrated Care in Youth Mental Health theme as we take forward our work on wellbeing.

We are actively looking for collaboration with other themes and other researchers, and are particularly looking forward to working on the nationwide ARC cross-cutting themes on Inequalities, Population Health, Behavioural Science and Prevention.

Please don't hesitate to contact us.

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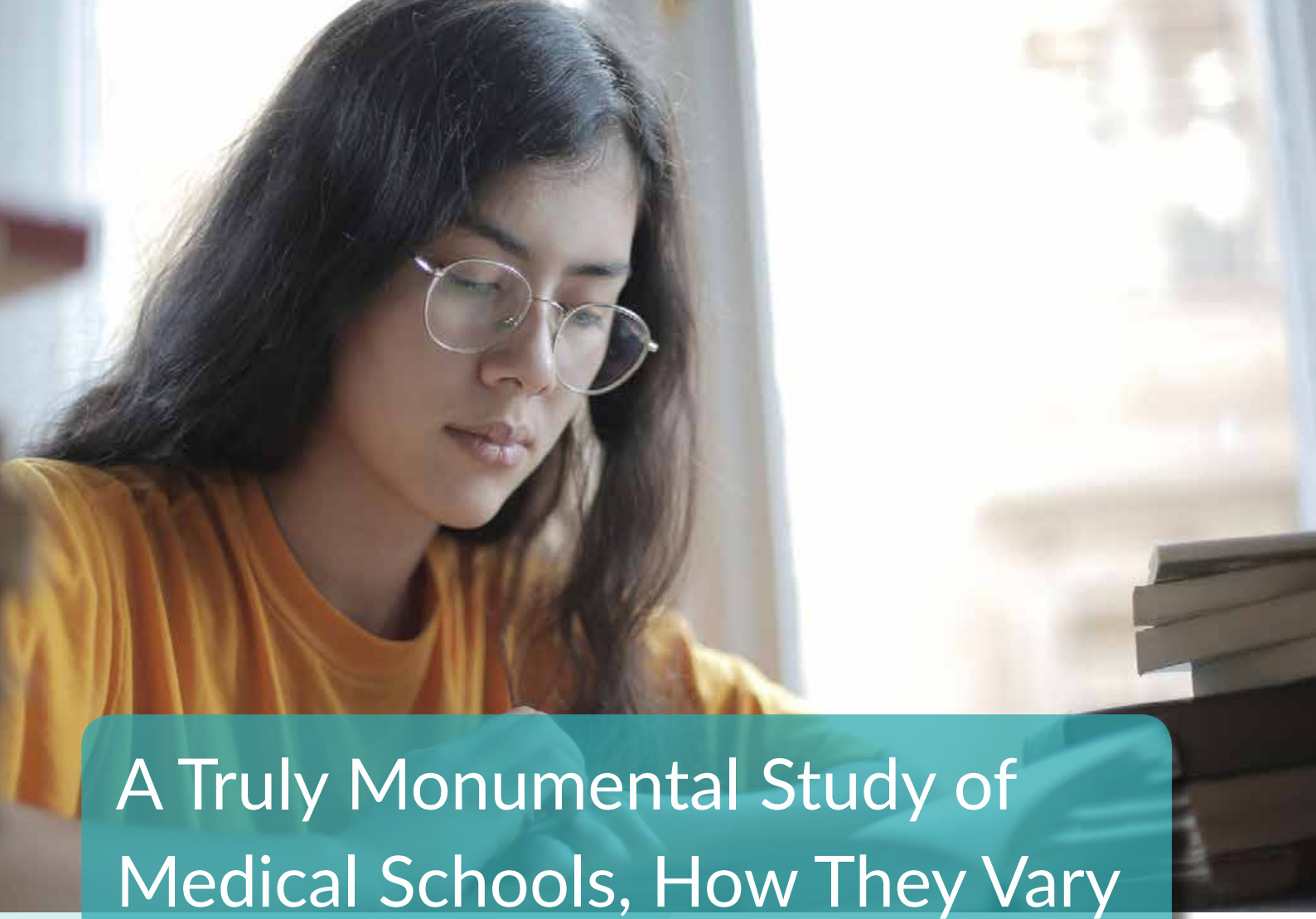

A Truly Monumental Study of Medical Schools, How They Vary and the Results They Achieve

Richard Lilford, ARC WM Director

That medical schools are not identical, and that they vary in many ways, is not news. Over the years both the GMC and NHS England have expressed interest in this variability. Furthermore, there is quite large (20 percentage points) variation in how prepared medical students feel for clinical work when they leave medical school. Some medical schools rely heavily on problem-based learning, while others do not. Some medical schools are heavily primary care orientated, while others are much less so. Of course there are differences in the curriculum and in admission criteria between schools. How do all these factors influence the product?

To find out, McManus, along with more than 100 co-authors, collected data from all 29 medical schools that run five-year courses.[1] Thus Warwick and South Wales were excluded. They collected explanatory data of the above sort and looked at examination performance and complaints.

Of course, they found very large numbers of positive correlations, even after adjusting for the number of statistical tests performed. They tried to carry out causal pathway analysis using structured equations. However, there was so much interaction between variables that it remained difficult to say exactly what was causing what.

Nevertheless, there were some interesting findings. One such feature is that differences between medical schools are stable overtime. Devoting high proportions of medical school teaching time to psychiatry did not result in more specialist trainees in that subject. However, schools that taught a higher proportion of general practice did produce more GP trainees. Interestingly, however, these schools obtained lower marks on the MRCGP examination. The ARC WM Director has never been a fan of problem-based learning as the foundation for medical education.[2] He has always believed that a systematic and structured approach should proceed problem-based methods. The results provide some vindication for this position, since doctors from schools that rely heavily on problem-based learning receive lower performance scores on post-graduate examinations. Further, student satisfaction correlates inversely with post-graduate performance. The causal path analysis showed that exam performance at school and medical school was positively associated with post-graduate examination performance. In line with a previous News Blog,[3] self-regulated learning was associated with better subsequent performance. How satisfied a student was with their education and how prepared they felt for clinical work had no influence on post-graduate outcomes. Schools producing higher proportions of male graduates and of GPs had higher numbers of fitness to practice issues.

The authors are careful in the conclusions they draw. The ARC WM Director is less so. He has long argued that, since academic excellence is not negatively correlated with compassion and humanity, medical students should be chosen on academic credentials, rather than nonsense interviews. They should be given a thorough academic foundation at medical school. Their teachers should be role models for patient-centred care, ethical rectitude and academic excellence. Never again should educational psychologists be allowed to dictate the medical curriculum.

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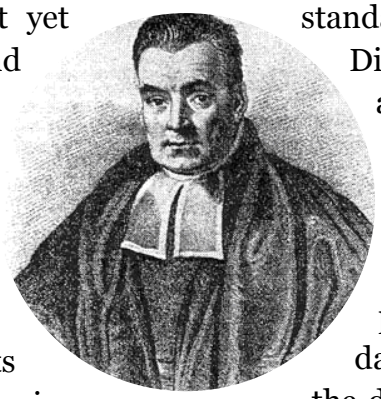
1. McManus IC, Harborne AC, Horsfall HL, et al. Exploring UK medical school differences: the MedDifs study of selection, teaching, student and F1 perceptions, postgraduate outcomes and fitness to practise. *BMC Med*. 2020; **18**: 136.
2. Lilford RJ. Education Update. NIHR CLAHRC WM News Blog. 2 September 2016.
3. Lilford RJ. A Thoughtful Article on the Radical Changes Pending in Medical Education. *NIHR ARC West Midlands News Blog*. 27 March 2020; **2**(3): 11-12.

Bayes Rides Again

Richard Lilford, ARC WM Director

The ARC WM Director has been advocating Bayesian trial analysis for three decades. [1][2] The method has not yet caught on. However, every now and then a Bayesian re-analysis of trial data is carried out.[3]



An excellent example of the light that a Bayesian analysis can shed on borderline or inconclusive trial results has recently been published by Brophy in JAMA.[4] This trial concerned the old chestnut of percutaneous coronary angioplasty versus open coronary bypass surgery. In the analysis of a large recent study, the hypothesis test showed no difference for a composite outcome that included mortality. However, re-analysis using an informative prior elicited from experts who were privy to all other trial data, showed a three percentage point difference in favour of open surgery. The probability that there was no difference in mortality was very low.

This reanalysis, along with many other examples, shows the inadequacy of the standard hypothesis testing approach. Dichotomising study results on an arbitrary threshold just will not do. Furthermore, Bayesian analysis provides the kind of probability that decision makers need. The Bayesian approach provides the probabilities of an effect given the data, rather than the probability of the data given a hypothesised effect. In this sense Bayesian methods are axiomatically superior when used as the basis for a decision.

Disagreement over the meaning of hypothesis tests in the above trial led to the senior surgical author withdrawing his name. It is high time to abandon hypothesis tests in favour of a more grown-up method. The time has also come to think causally and take evidence in the round, even borrowing strength from the same treatment in different conditions.[5]

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1. Lilford RJ, Thornton JG, Braunholtz D. Clinical Trials and Rare Diseases: A Way Out of a Conundrum. *BMJ*. 1995; **311**: 1621-5.
2. Braunholtz D, Lilford RJ. For Debate: The statistical basis of public policy: a paradigm shift is overdue. *BMJ*. 1996; **313**: 603.
3. Hemming K, Chilton PJ, Lilford RJ, Avery A, Sheikh A. Bayesian Cohort and Cross-Sectional Analyses of the PINCER Trial: A Pharmacist-Led Intervention to Reduce Medication Errors in Primary Care. *PLoS One*. 2012; 7(6): e38306.
4. Brophy JM. Bayesian Interpretation of the EXCEL Trial and Other Randomized Clinical Trials of Left Main Coronary Artery Revascularization. *JAMA*. 2020.
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Psychopathology Early in Life Predicts Psychopathology Later in Life

But the Type of Psychopathology Varies Over the Life Course

Richard Lilford, ARC WM Director

Gene-wide association studies show that certain clusters of genetic polymorphisms are associated with mental health disease clusters. For example, severe mental illness with associated thought disorder is associated with a different set of genes from internalising conditions, such as depression, generalised anxiety and phobias. A new study from Dunedin, New Zealand, takes a life course approach to a mental illness.[1] Caspi and colleagues, writing in JAMA, report on the long-term outcome of a birth cohort of over 1,000 participants. The cohort has been followed up regularly over 45 years.

Similar to a previous Danish study,[2] they find that people who suffer from mental illness when young, tend to have recurring mental illnesses that vary in type within broader groupings. In this investigation they also find that a relative decline in cognitive performance during childhood is associated with a higher risk of recurring mental illnesses in later life. Moreover, they find structural brain changes that are correlated with mental illnesses.

This study is highly consistent with the idea of genetic predisposition to specific sets of mental illnesses. It strongly challenges the emphasis that the International Classification of Diseases places on single conditions. It also strongly supports therapeutic approaches that cut across tightly defined mental disorders. Indeed, the findings support the multiple indication review approach promulgated by ARC West Midlands. [3]

References:

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3. Chen Y-F, Hemming K, Chilton PJ, et al. Scientific hypotheses can be tested by comparing the effects of one treatment over many diseases in a systematic review. *J Clin Epidemiol*. 2014; **67**(12): 1309-19.

Use of Antenatal Corticosteroids Seems to be Associated with Neurocognitive Delay

Richard Lilford, ARC WM Director

Antenatal steroids have been shown to induce premature birth in sheep, but not in humans. The famous New Zealand scientist, Sir Graham Liggins, noticed that the lambs frequently survived, despite being born at a gestational age at which they would have been expected to die. Subsequent randomised trials in humans showed that the risk of respiratory distress syndrome in premature new-born babies could also be reduced by antenatal corticosteroid injections.[1] In fact, the forest plot of these studies is the emblem of the Cochrane organisation.

However, there have always been worries about the effect of these steroids on the baby's brain. These worries have been vindicated by a recent paper from Finland in JAMA.[2] In a very large retrospective study, the authors show that there is an association between antenatal steroid administration and neurocognitive delay in the child. The size of the effect is similar to that of smoking in pregnancy. Impressively, there were sufficient maternal siblings in this study for a separate comparison to be made within this sub-group. The association held good among sibling pairs, one who had and one who had not received antenatal steroids.

What are the implications of these findings? Certainly, I would recommend antenatal steroids in someone highly likely to give birth before 34 weeks of gestational age. However, I would not recommend steroids beyond this, nor multiple doses of steroid. Nearly half of woman given antenatal steroids in premature labour do not go on to deliver. We clearly need better methods for the diagnosis of genuine premature labour. We also need an alternative to steroids for the maturation of the foetal lung.

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1. Crawley PA, Chalmers I, Keirse MJ. The Effects of Corticosteroid Administration Before Preterm Delivery: An Overview of the Evidence From Controlled Trials. *Br J Obstet Gynaecol.* 1990; **97**: 11-25.
2. Räikkönen K, Gissler M, Kajantie E. Associations Between Maternal Antenatal Corticosteroid Treatment and Mental and Behavioral Disorders in Children. *JAMA*. 2020; **323**(19): 1924-33.

The Dangers of Sharing an Office

Peter Chilton, Research Fellow

Over the last few years many offices across the world have moved towards a shared or open-plan workspace. There are a number of reasons why an employer may do this: reducing the space taken up by each employee, thereby either saving costs or allowing more staff to be hired; an assumption that it will increase communication and productivity; being able to share resources more efficiently, etc. While all of these are beneficial to the employer, how does it affect the employees? Previous studies have suggested that open-plan offices can lead to problems such as increased health issues or sickness rates. However, many of these studies have faced criticisms, as they have often been based on inadequate study design, and/or do not investigate confounding factors. To this end, researchers in Norway recently carried out a study to examine whether office design was a risk factor for retirement due to disability, and determine the contribution of confounders.[1] We have mentioned in a previous News Blog about the negative effects early retirement can have on mortality.[2]

The authors combined data from surveys sent to 6,779 Norwegian office workers, with registry data on skill-level, disability and sickness. After adjustment, the model found that people working in shared or open-plan offices had significantly higher risks of retiring due to disability compared to those working in single offices (hazard ratios 1.52 [95% CI 1.08-2.16] and 1.95 [95% CI 1.31-2.90] respectively). Additionally, the authors also found that gender, work ability, sickness absence and conscientiousness all had independent, direct effects of the risk of disability retirement.

The authors offer two possible explanations for their findings. Coping with the noise and distractions inherent with a shared office space can significantly affect concentration, which can result in tiredness, fatigue, sensory overload and mental distress. Further, the lack of privacy may lead to employees feeling they are constantly under observation or being listened to, creating dissonance and distress – employees may feel they lack control in influencing their own work environment. This lack of job control has consistently been shown to be a predictor for disability retirement.[3]

References:

1. Nielsen MB, Emberland JS, Knardahl S. Office Design as a Risk Factor for Disability Retirement: A Prospective Registry Study of Norwegian Employees. *Scand J Work Environ Health*. 2020.
2. Chilton PJ. Dreaming of Early Retirement. *NIHR ARC West Midlands News Blog*. 2020; **2**(4): 10.
3. Knardahl S, et al. The contribution from psychological, social, and organizational work factors to risk of disability retirement: a systematic review with meta-analyses. *BMC Public Health*. 2017;**17**(1):176.

Increasing Inequity Where No One is Left Worse Off

Richard Lilford, ARC WM Director

Mrs Ball is a patient with many health needs. She has systemic autoimmune disease and has had a kidney transplant. Until a few years ago her life was dominated by visits to outpatient departments: rheumatology, kidney medicine, dermatology and more. Now her blood tests are taken at her family practice, the results are transmitted to her and her doctor electronically, she can read her notes online, and she only goes to the hospital outpatients departments when she really needs to. Previously she attended by appointment, sometimes when she felt entirely well, while other times she felt well but could not attend. Mrs Ball is a well-off university graduate. It turns out that people of lower socioeconomic standing are considerably less likely to take up electronic communications compared to those who are better off.[1]

In this blog, I present two arguments to rebut those who say that innovations, such as video consultations and patient access through hospital electronic portals, should not be rolled out across the country on the grounds that they increase inequity.

First, the overall utility that society gains is increased, as long as those who do not take up the system are not left worse off. It is hard to see in this case, as in many others, why people who decline a new service should be worse off simply because others decide to accept it. It is one thing to argue that it is unfair if some people are offered a service that is withheld from others. But it is quite another to say that it is unfair to offer a service simply because an identifiable group have a low uptake relative to others.

My second argument against withholding a service simply because it is likely to be more highly utilised by richer people, turns on the way new ideas are spread in society. Many goods and services that are now routine started out as the preserve of the rich. For example, refrigerators were ruinously expensive when first introduced and few people saw the need for such a contraption. However, when early adopters enthusiastically reported on their merits, fridges started to spread in society, and as demand went up, so to did supply and therefore prices plummeted. Now, even the poorest people in Britain have a fridge.

None of this is to say that unequal uptake should not be tackled, and there is every reason to market a new service that is likely to benefit many people. The issue of inequity should not simply be ignored, and the service should be designed in such a way as to maximise its acceptability to all parts of society, just as fridges come in many shapes and forms, catering to various budgets and spaces.

Inequality is very important. However, it should not be used as an excuse to avoid introducing new services, as long as this does not leave anyone worse off. The general principle here was articulated by Vilfredo Pareto: in a situation where some people are genuinely made worse off so the majority can benefit, then those who are jeopardised should be compensated to the value of the loss.

Reference:

1. Kontos E, Blake KD, Sylvia Chou W-Y, Prestin A. Predictors of eHealth Usage: Insights on The Digital Divide From the Health Information National Trends Survey 2012. *J Med Internet Res*. 2014; **16**(7): e172.

An Epidemic of Quality Measurements to Reimburse Healthcare Organisations for Clinician and Health System Performance

Richard Lilford, ARC WM Director

The US Centers for Medicare and Medicaid services (CMS) ties financial incentives to quality and measurements. A recent paper in JAMA studied the proliferation of quality measures and associated spending by CMS.[1]

They found that 788 quality measures are currently in use in CMS programmes, while a further 738 are under development. Of the 788 measures currently implemented, 409 were process measures and 236 were outcome measures.

Over a decade, more than $1.3 billion has been spent simply to develop and maintain these quality measures. Yet a recent study found that only about one-third of these measures were valid.[2] Reminiscent of decision support for prescribing, the time has come to prune measures used for performance monitoring and reward.

References:

1. Wadhera RK, Figueroa JF, Maddox KEJ, et al. Quality Measure Development and Associated Spending by the Centers for Medicare & Medicaid Services. *JAMA*. 2020; **323**(16): 1614-6.
2. MacLean CH, Kerr EA, Qaseem A. Time out: charting a path for improving performance measurement. *N Engl J Med*. 2018; **378**(19): 1757-1761.

ARC WM Quiz

What is the **wet bulb temperature**?

email your answer to:
ARCWM@warwick.ac.uk

Answer to previous quiz: The patron saint of plagues who was also patron saint of dogs was **Saint Roch (or Rocco)**, who lived around 1295-1327.

Congratulations to Joydeepa Darlong, Alan Hargreaves and Anne Phillips who were first to answer correctly.

Latest News

Black Lives Matter

The NIHR have recently issued a statement recognising the problem of racism and structural barriers to minority communities in the research system. "Black Lives Matter. We stand in solidarity against racism and anti-blackness and we acknowledge that as a research organisation we have more to do. We need more black voices within our leadership, in our committees, in our institutions and in the cohorts of people we fund. We must oppose racism in all its forms."

The full statement is available at: nihr.ac.uk/news/nihr-stands-by-black-lives-matter/25039.

Take Part in COV-ED Study Exploring Mental Health

Members of our Youth Mental Health theme, along with colleagues at the University of Warwick are conducting a survey exploring the experience of parents/carers and teachers who are supporting young people aged 11-15 with learning and teaching from home during the COVID-19 lockdown in England, including the impact this may be having on their mental health and wellbeing. The survey should take around 15 minutes to complete. If you are interested then it is available at: https://t.co/BIrdkGd3A9?amp=1.

ARC West Midlands PhDs at University of Warwick

We have two fully-funded, full time, three-year PhD studentships available in Warwick Medical School from September 2020. Applications for these studentship are invited focusing on one of the following topics:

- What are the challenges facing small-medium organisations in supporting health and wellbeing initiatives in the workplace?
- How can knowledge needed to evaluate health technologies be produced, exchanged and applied in politically changing environments?
- What has been the uptake, use and impact of HTA research evidence disseminated by the NICE Technology Appraisal programme from 2012 to 2017?
- How can co-production be implemented in the ARC WM as a test bed for the wider NIHR? How can co-production be operationalised?
- Improving communication about self-harm in schools through developing a theory and evidence-based (digital) intervention aimed at teachers.
- Improving health and wellbeing for people with intellectual disability and their caregivers.

For more information, please visit: https://www.findaphd.com/phds/program/nihr-applied-research-collaboration-west-midlands/?p4765.

The deadline for applications is 12pm on Monday 29 June 2020.

The King, COVID-19 and the RCT

Dr Celia Brown, University of Warwick, has produced a ten minute video for primary school children explaining randomised controlled trials using the topic of COVID-19. The work was inspired by Julia Donaldson's book "*The Cook and the King*".

The video is available at: warwick.ac.uk/about/community/projects/educationresources/king_covid_rct_1.mp4.

A full transcript can also be found here.

National NIHR Newsletter on COVID-19

The latest newsletter covering all of the NIHR ARCs has recently been released. The June issue focusses on how each of the 15 national ARCs are supporting the COVID-19 response through applied health research. It is available at: https://t.co/EgIzSZnArY?amp=1

To subscribe to future issues, please visit: https://tinyurl.com/ARCsnewsletter.

NIHR RDS WM Post-Award Support

The NIHR Research Design Service West Midlands are offering support to those conducting a research project for which you received funding from an open, national, peer-reviewed funding scheme and are currently experiencing problems, for example due to COVID-19 and the impact lockdown has had on many studies. RDS WM can assist with problems relating to issues of research design, and can provide assistance whether or not you had RDS support when submitting your study for funding. You can contact them through your local hub or by sending a general support request via their website: rds-wm.nihr.ac.uk/submit-request.

Open Call for Expertise: CVD Prevention and NHS Health Check Programme

Public Health England are seeking academics with expertise in primary and secondary prevention of cardiovascular disease and its risk factors, and/or the NHS Health Check programme. They are specifically looking for expertise in any of the following risk factors: physical activity, weight, alcohol, smoking, blood pressure, cholesterol, blood sugar and behaviour change.

They want to continue to build the evidence base on the NHS Health Check programme to inform policy decisions and ensure it remains fit for purpose for the next 10 years and beyond. For this they require a wide range of experts on the PHE academic framework, who can be called on for support and commission any necessary pieces of research or evaluation.

If you are interested, please send a short 1-page CV to academicPH@phe.gov.uk by 5pm on Tuesday 30th June 2020.

Latest Funding Opportunities

COVID-19: Longer Term Recovery and Learning Research

The NIHR and UK Research and Innovation have announced an evolution in their funding of COVID-19 research. A new Recovery and Learning funding call has been announced to better understand and manage the health and social care consequences of the global COVID-19 pandemic beyond the acute phase. This call is for research proposals of up to 24 months' duration.

Deadline for applications is Tuesday 14 July 2020, 1pm. For more information, please visit: nihr.ac.uk/covid-19/funding-longer-term-recovery-and-learning-research.htm

NIHR HS&DR Funding Opportunity

The NIHR HS&DR programme is now accepting stage 1 applications for a workstream looking at community pharmacies (20/56). Community pharmacies are currently undergoing rapid change and expansion in the services they offer to support the health and social care of people in their local area. The focus of this call is on extended community pharmacy services i.e. services delivered by a community pharmacy that go above and beyond just the dispensing of medicines. The setting is not limited to services that take place within the community pharmacy itself. For example, evaluating services delivered by a community pharmacy which take place in a person's own home, care home or other community setting would be within remit for the call and are encouraged. More information is available at: nihr.ac.uk/funding/2056-community-pharmacies/25083.

Deadline for applications is 25 September 2020, 1pm.

Recent Publications

Ayorinde AA, Williams I, Mannion R, Song F, Skrybant M, Lilford RJ, Chen Y-F. Publication and related biases in health services research: a systematic review of empirical evidence. *BMC Res Methodol*. 2020;**20**:137.

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Vusio F, Thompson A, Laughton L, Birchwood M. After the storm, Solar comes out: A new service model for children and adolescent mental health. *Early Interv Psychiatry*. 2020.