NIHR | Applied Research Collaboration West Midlands

Volume 6, Issue 3

NIHR | Midlands Patient Safety Research Collaboration

ARC West Midlands & Midlands PSRC News Blog

9 August 2024

Mental Illnesses and Social Contagion

Richard Lilford, ARC WM Director, PSRC Midlands Co-Director

I thank Gus Hamilton for drawing my attention to a recent article on clustering of mental illness in populations. Gus is an infectious disease specialist and is therefore interested in all things infectious/contagious. So, he was naturally attracted by an article in JAMA on contagion among mental conditions, such as anxiety and depression in high school classes (median age 16.1).[1] The article detected a pattern of clustering – when one case occurred, the probability of further cases was non-random – the conditions tended to cluster.

The authors controlled for several confounders, like socio-economic conditions, sex and so on, insofar as they were available in the data. Moreover, children are assigned to schools by geographical location, rather than parent preference or competitive selection, allowing the authors to argue that assignment could be regarded as an 'instrument'.

The clustering then seems to be a manifestation of a degree of social contagion. The mechanism could be mimetic behaviour. Certainly, there is evidence, external to this study, for the contagion hypothesis from *anorexia nervosa* and suicide.

[2, 3] An uncomfortable thought that passed through my mind –could the clustering be attributed to a 'teacher effect'; i.e. that some teachers may drive you to depression?

This study was conducted pseudo-anonymously in a Nordic country where rich databases allowed the necessary (pseudo-anonymous) linkages to be made.

Widening the discussion to psychological traits in general, the notion of social contagion is a troubling one. On the one hand, people should be autonomous and allowed to make their own choices. On the other, those choices are not totally endogenous to the person. That is to say, preferences and behaviours have an ephemeral element according to the social environment to which a person is exposed. Freedom to associate with whom one wishes (including on-line) and to make autonomous decisions are good things I would fight to preserve. But they are not cost free. Perhaps we should have more philosophy in our lives, encouraging complex approaches to complex problems and foster individual thought as an antidote to group-think and following whatever herd one becomes attached to.

References:

1. Alho J, Gutvilig M, Niemi R, et al. Transmission of Mental Disorders in Adolescent Peer Networks. *JAMA Psychiatr*. 2024.

2. Allison S, Warin M, Bastiampillai T. Anorexia nervosa and social contagion: Clinical implications. *Aust N Z J Psychiatry*. 2014; **48**(2): 116-20.

3. Martínez V, Jiménez-Molina A, Gerber MM. Social contagion, violence, and suicide among adolescents. *Curr Opin Psychiatry*. 2023; **36**(3): 237–42.

ARC WM Quiz

Who discovered the cause of bilharzia (also known as Schistosomiasis), which is a disease spread by contaminated water via freshwater snails and affects around 236m people annually.

email your answer to: arcwm@contacts.bham.ac.uk

Answer to previous quiz: The snake that is believed to cause the greatest number of human deaths each year is the **saw-scaled viper (*Echis carinatus*)**, due to a combination of high aggression and being found in highly populated areas in the Middle East and Central Asia. Congratulations to those who answered correctly.

Dealing with Medically Unexplained Symptoms

Richard Lilford, ARC WM Director, PSRC Midlands Co-Director

Most clinical specialties must deal with medically unexplained symptoms – ear, nose and throat specialists deal with tinnitus; general surgeons and gynaecologists with unexplained abdominal pain; chest physicians with symptoms that mimic angina; and so on. When I was in practice, I found such symptoms extremely challenging. Some clinicians handle this dilemma by coming up with dubious, physical diagnoses, such as abdominal migraine, or irritable bowel syndrome. Sometimes, the clinician and patient will clutch at a minor abnormality, such as a tiny spot of endometriosis or an abdominal adhesion left over from appendectomy.

But now, neuropsychiatry has discovered that pain can exist and be very real without any tissue cause whatsoever. Knowing this is one thing, however, doing something about it is another.

Writing in the Lancet, Burton and colleagues describe a lovely, randomised trial of a therapy aimed precisely at neurogenic symptoms.[1] They evaluated a therapy based on four components. First, acknowledge the reality of the pain. Second, discuss the (central nervous system) mechanism that generates the symptoms. Third, provide techniques and strategies so that the person can exert mental control over the cause of the symptoms. Fourth, support the patient sympathetically and with encouragement and reinforcement. This treatment proved effective in a randomised trial of 354 participants.

The trial was pragmatic with usual care controls, so we do not know whether an alternative method, which focused equal time on the patient, could have achieved similar results. Either way, the findings are impressive and suggest that the therapy should be more widely implemented. This seems to call for an implementation trial, of the sort in which ARCs are experienced. This might be an interesting project on which primary care transitions in a number of ARCs may wish to collaborate.

Reference:

1. Burton C, Mooney C, Sutton L, et al. Effectiveness of a symptom-clinic intervention delivered by general practitioners with an extended role for people with multiple and persistent physical symptoms in England: the Multiple Symptoms Study 3 pragmatic, multicentre, parallel-group, individually randomised controlled trial. *Lancet.* 2024; **403**: 2619-29.

Towards a Checklist for Computer Decision Support

Richard Lilford, ARC WM Director, PSRC Midlands Co-Director

The most recent issue of Johanna Westbrook's Health Innovation Series concerns e-medication safety.[1] It starts with the "curious incident" of a hundred-fold over-dose of anticoagulant administered to a paediatric patient. This problem arose because the computerised prescription system allowed text to be entered freely in scenarios when the drop-down menu could not accommodate the desired dose. The prescriber had to use the drop-down menu to obtain the correct dose and made a double decimal point error.

This is just one of the hundreds of things that can go wrong in healthcare, and many other examples are recorded in the above Health Innovation Series.

Checklists are available to act as a guide for writing decision support software. For example, NICE has promulgated guidelines for computer decision support.[2] Our NIHR Midlands Patient Safety Research Collaboration (PSRC) is concerned that the recently introduced Patient Electronic Maternity records have not been adequately alpha and beta-tested. We are planning a simulation exercise to test these guidelines in practice. Previous work by our collaboration has shown that computer decision support can introduce unintended effects.[3]

References:

1. Merchant A, Fitzpatrick E, Westbrook JI, Raban MZ. The curious case of the 100-fold overdose. Health Innovation Series e-Medication Safety Issue 21. Sydney: Macquarie University; 2024.

2. National Institute for Health and Care Excellence. Evidence standards framework (ESF) for digital health technologies. 2019.

3. Weir CJ, Adamestam I, Sharp R, et al. A complex ePrescribing-based Anti-Microbial Stewardship (ePAMS+) intervention for hospitals combining technological and behavioural components: protocol for a feasibility trial. *Pilot Feasibility Stud*. 2023; **9**(1): 18.

A Fascinating and Perceptive Slant on 'Big Data', Machine Learning and All That Lot

Richard Lilford, ARC WM Director, PSRC Midlands Co-Director

A paper in the New England Journal of Medicine recently caught my eye.[1] The article focuses on 'data-shift'. Data-shift comes when the data used to derive a risk score/category are ephemeral – changing from one time and place to another. The article starts with a character called Tim de Dombal. I got to hear about de Dombal while he was still a medical student (top student!) in Johannesburg in 1973. de Dombal had come up with a Bayesian algorithm to diagnose the cause of abdominal pain based on clinical signs and symptoms. He had recently published a paper in the BMJ showing that the algorithm (run on a mainframe!) out-diagnosed specialist surgeons – it made the correct diagnoses 92% of the time.[2] Later, as it turned out, I worked with de Dombal at St James' Hospital, Leeds. In the meantime, de Dombal's system had been tried out in Copenhagen with far lower success – 65% correct.[3] What had happened? The data-set to which the results were applied had different characteristics – different ages, referral patterns, gender mix – all sorts of things resulted in a mis-specified model. This phenomenon is equivalent to spectrum bias in diagnostic research.

This is a problem with artificial intelligence. And it is a problem with risk scores. One approach to mitigate this problem is to use additional data-sets structured in different ways. "Yet this strategy is expensive, laborious and incomplete."[1] There will always be the problem of 'transporting', 'generalising' or 'particularising'. I have pointed to this problem in numerous previous News Blogs on risk scoring [4] and AI.[5-6] In a future News Blog we will discuss potential approaches to this problem.

References:

1. Lea AS & Jones DS. Mind the Gap – Machine Learning, Dataset Shift, and History in the Age of Clinical Algorithms. *New Engl J Med*. 2024; **390**; 4: 293-5.

2. de Dombal FT, et al. Computer-aided Diagnosis of Acute Abdominal Pain. *Br Med J*. 1972; **2**: 9.

3. Bjerregaard B, et al. Computer-aided diagnosis of the acute abdomen: a system from Leeds used on Copenhagen patients. In: de Dombal FT, Gremy F, eds. *Decision making and medical care: can information science help?* Amsterdam: North-Holland, 1976.

4. Lilford RJ. Limitations of Risk-Scoring Generally and AI in Particular in Clinical Practice. *NIHR ARC West Midlands News Blog*. 2022; **4**(10): 2-3.

5. Lilford RJ. Generative, Artificial Intelligence and Diagnostic Accuracy: Expect More of These. *NIHR ARC West Midlands News Blog*. 2023; **5**(7): 3.

6. Lilford RJ. Commercial Evidence of the Limitations of AI in Studying Medical Notes. *NIHR ARC West Midlands News Blog*. 2022; **4**(8): 9.

Changing Which Antibiotics Are Prescribed for Pneumonia

Peter Chilton, Research Fellow

Each year, more than 200,000 people in the UK are diagnosed with pneumonia,[1] and research has shown that more people in the UK die from lower respiratory tract infections, such as pneumonia, than anywhere else in Europe.[2] When patients are hospitalised, they are often prescribed extended-spectrum antibiotics, even though standard-spectrum antibiotics are usually sufficient. This is due to the concern that the patient may be infected with multi-drug resistant organisms (MDROs). However, using extended-spectrum antibiotics can in turn increase the patient's risk of MDROs in the future. Therefore, it could be helpful to quickly identify patients who have a low-risk of their pneumonia being caused by MDROs, and therefore reduce the prescription and exposure of extended-spectrum antibiotics.

Over a 15-month period, researchers carried out a cluster randomised trial in 59 community hospitals across the USA,[3] aiming to evaluate the effects of a computerised provider order entry (CPOE) stewardship bundle against routine stewardship. The CPOE intervention consisted of education, feedback and real-time, patient-specific MDRO infection risk-based prompts, recommending standard-spectrum antibiotics for low-risk patients, as opposed to extended-spectrum antibiotics.

Nearly 100,00 adults were admitted with pneumonia during the study period and the 18-month pre-intervention baseline period, and analysis showed that hospitals using CPOE stewardship had a significant reduction in use of extended-spectrum antibiotics and in days of therapy. Hopefully, this approach could help combat the growing threat of antibiotic resistance while still ensuring patients receive appropriate treatment. The intervention did not lead to any significant difference in safety outcomes, such as ICU transfer or hospital length of stay. However, working on an NIHR Programme Grant, we have modelled the downstream outcomes from upstream process improvements in antibiotic practice. We show:

1. Plausible benefits are far too small to detect infeasible/affordable studies.

2. These plausible benefits are nevertheless cost-effective over extensive sensitivity analyses.

References:

1. British Lung Foundation. Pneumonia. 2019.

2. International Respiratory Coalition. Lower Respiratory Tract Infections (LRTIs). 2024.

3. Gohil SK, Septimus E, Kleinman K, et al. Stewardship Prompts to Improve Antibiotic Selection for Pneumonia: The INSPIRE Randomized Clinical Trial. *JAMA*. 2024; **331**(23): 2007-17.

Can Omega-3 Fatty Acids Help Prevent Depression? New Research Sheds Light

Peter Chilton, Research Fellow

Depression affects millions of people worldwide and is a leading cause of disability. Although there are a range of treatments available, prevention is preferable. Omega-3 fatty acids – found in fish oil and some plant sources – have previously been suggested to help prevent depression, and a study published in *Translational Psychiatry* shows they may indeed play a protective role.

The researchers analysed genetic and health data from over 430,000 people in the UK, looking for possible genetic variants that could influence omega-3 levels in the body and how these related to depression risk.

The results suggest that people who are genetically predisposed to have higher omega-3 levels may also have a lower risk of depression. Higher overall omega-3 levels were associated with ~4% lower odds of depression (p=0.003), with the strongest effect shown for the eicosapentaenoic acid form of omega-3, with a potential 8% reduction in depression risk (p=0.0002). These effects remained even when taking other factors, such as cholesterol levels, into account. Interestingly, the researchers didn't find any association between omega-6 fatty acids – usually found in plant-based oils – and depression risk.

Although these effects are small, even modest reductions in depression risk could have a significant impact across entire populations. It may be worth considering whether targeted interventions for people with low omega-3 levels might be more effective than universal prevention efforts.

Reference:

1. Carnegie R, Borges MC, Jones HJ, et al. Omega-3 fatty acids and major depression: a Mendelian randomization study. *Transl Psychiatry*. 2024; **14**: 222.

Major Report on Strengths-Based Transformation Published

Strengths-based principles, which emphasise that social care should focus on what matters to people and communities and build on their existing networks and resources, are widely supported across the sector and most importantly by many people and their families. Despite this and the potential of strengths-based approaches to transform practice and policy, there has been little evidence on its actual impacts and how the principles can be best embedded in social care processes and ways of working.

A two year study led by the University of Birmingham, King's College London, and University of Kent as part of the NIHR National Priority Programme for Adult Social Care & Social Work, has been investigating the embedding and impacts of strengths-based practice though the Community Led Support (CLS) programme. CLS was developed by the National Development Team for Inclusion to take a systems-wide approach to strengths-based working and has been implemented in over thirty local authorities across the UK.

Findings from the study are now available – they suggest that CLS led to positive impacts on social care assessment and care management activities in comparison to non-CLS areas and highlight the contribution of community-based health and social care hubs, national learning networks, and the NDTI programme team's role in turning strengths-based principles into social care
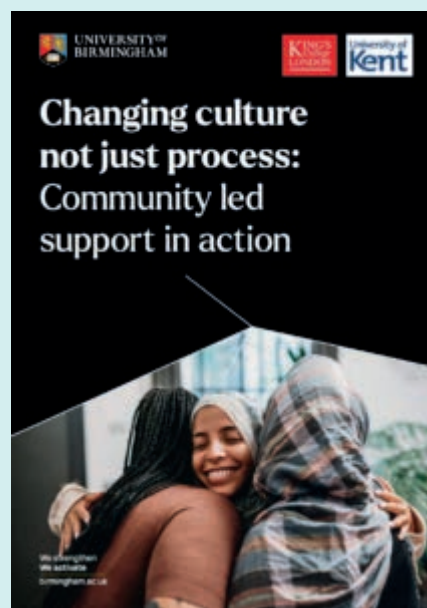
practice. The study also identified opportunities to further develop the CLS approach in relation to co-production with people and communities, distributing leadership, and involvement of the voluntary and community sector. The full report can be read at: https://arc-kss.nihr.ac.uk/resource-library/545-changing-culture-not-just-process-community-led-support-in-action/file

The next stage of the collaboration with NDTI will explore how to develop new support and resources to better embed culture changes relating to strengths-based practice, and this will include a series of animations sharing the key insights from the research to date. The first of these animations can be watched online: https://youtu.be/EXUbxEtomBI. The next phase of the project will also focus on the role, implementation and collaboration involved in creating the CLS community spaces activity.

Birmingham Founders' Award

Each year the University of Birmingham recognise the very best academic work in the university, and celebrate the achievements of outstanding academic colleagues, with the Founders' Awards.

This year, Prof Melanie Calvert (part of our Long-term Conditions theme) was awarded the *Josiah Mason award for Academic Advancement* for her work on the impact of disease and treatments on patient symptoms and quality of life; while Prof Sara Kenyon (lead of our Maternity theme) was awarded the *Rose Sidgwick Award for External Engagement and Impact* for her work on maternity triage. Prof Lee Aiyegbusi (part of our Long-term Conditions theme) was also nominated for the *Florence Price Award for External Engagement and Impact* for his research on long COVID.

Latest National NIHR ARC Newsletter

The July issue of the national NIHR ARCs newsletter, features blogs on inclusive health research, supporting A&E, effectiveness of virtual wards, and a multidimensional concept of disability. It is available at: https://t.co/w4QS3oBLxN

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

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World Patient Safety Day Events

On behalf of the SafetyNet network, NIHR Midlands PSRC will be hosting two events in September for World Patient Safety Day, both around the theme of "*Improving diagnosis for patient safety*".

An in-person event will be held at the Queen Elizabeth Hospital in Birmingham on **Wednesday 18 September**, aiming to raise awareness of patient safety and the work being done in the local area.

An online event will be held on **Thursday 19 September**, running from 12pm to 2pm, with discussions from a number of prominant experts.

For more information, and to reserve a place, please email: please e-mail: midlands-psrc@contacts.bham.ac.uk.

Recent Publications

Ahmad Khan K, Petrou S, Smyth M, Perkins GD, Slowther AM, Brown T, Madan JJ. Comparative cost-effectiveness of termination of resuscitation rules for patients transported in cardiac arrest. *Resus*. 2024: 110274.

Archer C, Kessler D, Wiles N, Chew-Graham CA, Turner K. Exploring GPs' views on beta-blocker prescribing for people with anxiety disorders: a qualitative study. *Br J Gen Pract*. 2024: BJGP.2024.0091.

Ayorinde A, Ghosh I, Shaikh J, Adetunji V, Brown A, Jordan M, Gilham E, Todkill D, Ashiru-Oredope D. Improving healthcare professionals' interactions with patients to tackle antimicrobial resistance: a systematic review of interventions, barriers, and facilitators. *Front Public Health*. 2024; **12**: 1359790.

Bullock L, Manning F, Hawarden A, Fleming J, Leyland S, Clark EM, Thomas S, Gidlow C, Iglesias-Urrutia CP, Protheroe J, Lefroy J, Ryan S, O'Neill TW, Mallen C, Jinks C, Paskins Z. Exploring practice and perspectives on shared decision-making about osteoporosis medicines in Fracture Liaison Services: the iFraP development qualitative study. *Arch Osteoporos*. 2024; **19**(1): 50.

Campbell L, Quicke J, Stevenson K, Paskins Z, Dziedzic K, Swaithes L. Using Twitter (X) to mobilise knowledge for First Contact Physiotherapists: A qualitative study. *J Med Internet Res*. 2024; **26**: e55680.

Faux-Nightingale A, Somayajula G, Bradbury C, Bray L, Burton C, Chew-Graham CA, Gardner A, Griffin A, Twohig H, Welsh V. Coproducing Health Information Materials With Young People: Reflections and Lessons Learned. *Health Expect*. 2024; **27**(3): e14115.

Grasner JT, Bray JE, Nolan JP, Iwami T, Ong MEH, Finn J, McNally B, Nehme Z, Sasson C, Tijssen J, Lim SL, Tjelmeland I, Wnent J, Dicker B, Nishiyama C, Doherty Z, Welsford M, Perkins GD; International Liaison Committee on Resuscitation. Cardiac Arrest and Cardiopulmonary Resuscitation Outcome Reports: 2024 Update of the Utstein Out-of-Hospital Cardiac Arrest Registry Template. *Circulation*. 2024.

Hodgetts Morton V, Man R, Perry R, Hughes T, Tohill S, MacArthur C, Magill L, Morris RK; CHAPTER Group. "Childbirth Acquired Perineal Trauma study (CHAPTER): a UK prospective cohort study protocol". *BMJ Open*. 2024; **14**(5): e086724.

Hussey LJ, Kontopantelis E, Mok PLH, Ashcroft DM, Carr MJ, Garg S, Chew-Graham CA, Kapur N, Lovell K, Webb RT. Socio-demographic variation in diagnosis of and prescribing for common mental illnesses among children and young people during the COVID-19 pandemic: time series analysis of primary care electronic health records. *J Child Psychol Psychiatry*. 2024.

Krauth SJ, Steell L, Ahmed S, McIntosh E, Dibben GO, Hanlon P, Lewsey J, Nicholl B, McAllister DA, Smith SM, Evans R, Ahmed Z, Dean S, Greaves C, Barber S, Doherty P, Gardiner N, Ibbotson T, Jolly K, Ormandy P, Simpson SA, Taylor RS, Singh SJ, Mair FS, Jani BD. Association of latent class analysis-derived multimorbidity clusters with adverse health outcomes in patients with multiple long-term conditions: comparative results across three UK cohorts. *eClinicalMedicine*. 2024; **74**: 102703.

Lilford R. Locums: threat or opportunity. *BMJ Qual Saf*. 2024; **33**(6): 345-7.

Lip GYH, Nikorowitsch J, Sehner S, Becher N, Bertaglia E, Blomstrom-Lundqvist C, Brandes A, Beuger V, Calvert M, Camm AJ, Chlouverakis G, Dan GA, Dichtl W, Diener HC, Fierenz A, Goette A, de Groot JR, Hermans A, Lubinski A, Marijon E, Merkely B, Mont L, Ozga AK, Rajappan K, Sarkozy A, Scherr D, Schnabel RB, Schotten U, Simantirakis E, Toennis T, Vardas P, Wichterle D, Zapf A, Kirchhof P. Oral anticoagulation in device-detected atrial fibrillation: effects of age, sex, cardiovascular comorbidities, and kidney function on outcomes in the NOAH-AFNET 6 trial. *Eur Heart J*. 2024; **45**(19): 1733-7.

Miller R, Ehrenberg N, Jackson C, Stein V, Van der Vlegel-Brouwer W, Wojtak A. Just a story? Leadership, lived experience and integrated care. *Health Expect*. 2024; **27**(3): e14084.

Musgrove R, Carr MJ, Kapur N, Chew-Graham CA, Mughal F, Ashcroft DM, Webb RT. Primary care contact, clinical management and suicide risk following discharge from inpatient mental health care. *BJGP Open*. 2024: BJGPO.2023.0165.

Nikhab A, Morbey R, Todkill D, Elliot AJ. Using a novel 'difference-in-differences' method and syndromic surveillance to estimate the change in local healthcare utilisation during periods of media reporting in the early stages of the COVID-19 pandemic in England. *Public Health*. 2024; **232**: 132-7.

Palm ME, Evans D, Staniszewska S, Brady LM, Hanley B, Sainsbury K, Stewart D, Wray P. Public involvement in UK health and care research 1995-2020: reflections from a witness seminar. *Res Involv Engagem*. 2024; **10**(1): 65.

Patel R, Thornton-Swan TD, Armitage LC, Vollam S, Tarassenko L, Lasserson DS, Farmer AJ. Remote Vital Sign Monitoring in Admission Avoidance Hospital at Home: A Systematic Review. *J Am Med Dir Assoc*. 2024: **25**(8): 105080.

Smyth N, Ridge D, Kingstone T, Gopal DP, Alwan N, Wright A, Chaudhry A, Clark S, Band R, Chew-Graham CA. People from ethnic minorities seeking help for Long Covid: a qualitative study. *Br J Gen Pract*. 2024: BJGP.2023.0631.

Thelwell ELR, Dunkerley L, Goodwin R, Giacco D. Effectiveness of online social networking interventions on social isolation and quality of life of people with psychosis: A systematic review. *Psychiatry Res*. 2024; **339**: 116088.