THE PAPER IS ALIGNED TO THE DELIVERY OF THE FOLLOWING STRATEGIC OBJECTIVE(S) AND HEALTH AND CARE STANDARD(S):		
Strategic Objectives:	1. Focus on Wellbeing	✓
	2. Provide Early Help and Support	✓
	3. Tackle the Big Four	✓
	4. Enable Joined up Care	✓
	5. Develop Workforce Futures	✓
	6. Promote Innovative Environments	✓
	7. Put Digital First	✓
	8. Transforming in Partnership	✓
Health and Care Standards:	1. Staying Healthy	✓
	2. Safe Care	✓
	3. Effective Care	✓
	4. Dignified Care	✓
	5. Timely Care	✓
	6. Individual Care	✓
	7. Staff and Resources	✓
	8. Governance, Leadership & Accountability	✓

REPORT:

NORTH POWYS HEALTH AND WELLBEING PROGRAMME SUPPORTING EVIDENCE BASE

The model of delivery of primary care in Powys is being challenged by a variety of factors; but we are not alone. Throughout the world, rural practice is under threat with the most common issues being demographics, recruiting, expectation and changing (increasing) need[1]. However, in addition to the challenges, there are considerable rewards[2] associated with providing health care services in rural areas.

The OECD classes any area with a population density of less than 150 people per square kilometre as rural and the population density of Powys is only 26

[1] Ford DM Four persistent rural healthcare challenges. Healthc Manage Forum. 2016 Nov;29(6):243-246. Epub 2016 Oct 15.

[2] Lee LM. Equitable Health Care and Low-Density Living in the United States. Narrat Inq Bioeth. 2019;9(2):121-125. doi: 10.1353/nib.2019.0037.

people per square kilometre[3]. Powys, therefore, must be acknowledged that Powys is rural. However, the reality of rurality serves up several paradoxes; employment is, generally, higher in rural areas but so it in-work poverty. The landscape of rural areas is seen as idyllic with wide open spaces and fewer people yet with poor transport infrastructure and electronic connectivity, mental health issues due to loneliness are more frequently seen. The population is ageing more rapidly as more young people leave to pursue their life ambitions and more elderly people come into the area to live the rural dream in their early retirement only for this dream to fade as increasing frailty and isolation become the norm. this increase in a relatively affluent ageing population is making affordable housing more problematic for the young which further drives them out of the area. Rural populations have to travel further to access services of all types. All these, and many other, issues were highlighted in a joint publication between the Local Government Association and Public Health England[4]. However, the generalisations made about rural England can just as easily be applied to Powys.

Service design and delivery is affected by rurality and remoteness. The Scottish government also defines limited medical accessibility as any community more than 30 minutes by car from a facility that takes acute medical admissions. By this definition, the greater part of Powys could be considered "remote" from acute medical care of any type. However, only 10% of the entire Scottish population are considered to live in a remote area thanks to the provision of Rural General Hospitals in areas of the country with a low population base. These provide services not only to the Scottish Islands of Shetland, Orkney and Stornoway but also to remote towns such as Wick, Fort William and Oban. However, there is also the concept of "unavoidable smallness" which is defined as an organisation that serves at catchment area of under 200,000 people. This impacts on the quality and efficiency of medical treatment facilities which need a certain level of through put to maintain a safe service through maintaining clinical skills[5]. Evidence supporting the issue of unavoidable smallness, six of the seven NHS trusts in England that meet the definition (Isle of Wight, North Cumbria, Morecambe Bay, United Lincolnshire, Wye Valley and Scarborough) all ended 2017/2018 in significant debt and some were facing considerable issues concerning clinical delivery and patient safety and higher numbers of delayed transfers of care.

[3] OECD 2011 Rural Development OECD.org.

[4] LGA/PHE. Health and wellbeing in rural areas. Crown copyright 2017 at https://www.local.gov.uk/sites/default/files/documents/1.39_Health%20in%20rural%20areas_WEB.pdf accessed 22 Jan 2020.

[5] "Rural Health Care; A Rapid Review of the Impact of Rurality on the Costs of Delivering Healthcare. Nuffield Trust 2019

The literature concerning the primary care experience in the United Kingdom is growing but is not yet as rich as other Anglophone, developed countries such as Australia, the United States, Canada and New Zealand. The evidence base concerning evolving the model of care to meet the challenges of rurality is rich and ever growing and this this literature search provides a flavour of that richness.

The literature search for this evidence review has been conducted on PUBMED, the NCIH search engine of the MEDLINE database. Key words used were primary care, rural, physicians assistants, nurse practitioner, pharmacist, social determinants of health, environment and health. In addition, other peer reviewed papers were accessed directly from the world-wide-web using the google search function. Government documents and media examples further add to the picture that the evidence paints concerning the determinants of health and how services can be re-designed to deliver safe, sustainable care in the rural setting.

From the results of the initial search a scan of the title led to a judgement whether to review the abstract. Systematic reviews, free to view articles were then read and related articles scanned for their relevance. To that end, there is an acknowledged filter bias which should be considered with the inbuilt publication bias which favours papers with a positive message. Where papers were published that had a negative message, these have been included to provide some element of balance. An additional criticism is that even papers published within the last 5 years discuss data that is frequently 5 years older. However, accepting that data being used in today's debate is nearly a decade old, there is no doubt of the trends that are being seen. To that end, the debates remain valid in the context of modern data and observations.

The Wider Determinants of Health: The wider determinants of health are generally accepted as being education, relative poverty and, the living and working environment. The Health Profile For England published by the UK Government provides an excellent description of how these determinants effect health[6] and there is a wealth of accepted wisdom concerning how these determinants actually affect health and influence ill health and associated behaviours.

Education: There have been many systematic reviews of how the education system can influence the health of children. There appears to be

[6] https://www.gov.uk/government/publications/health-profile-for-england-2018/chapter-6-wider-determinants-of-health accessed 27 Jan 2020.

strong evidence that interventions delivered in schools can have a positive effect on mental health, substance misuse, smoking alcohol, teenage pregnancy and violence[7], [8], [9], [10], [11]. However, positive as the message concerning education and health improvement appears to be, some interpretations of the literature observe that further research is required[12], [13].

The Living Environment: There is a conventional wisdom that associates the living environment with health. Several reviews have been undertaken in high income countries looking at a range of health outcomes. Evidence reviewed in the recent Parliamentary Office of Science and Technology[14] briefing showed that "children who live in persistent bad housing conditions are more likely to have poor physical and mental health outcomes". This is further backed up in the peer reviewed literature[15], [16]. There is strong evidence that adequate affordable heating has an impact on health[17], [18], [19].

[7] Nichola Shackleton, Farah Jamal, Russell M Viner, Kelly Dickson , George Patton, et al School-Based Interventions Going Beyond Health Education to Promote Adolescent Health: Systematic Review of Reviews Adolesc Health 58 (4), 382-396 Apr 2016 PMID: 27013271 DOI: 10.1016/j.jadohealth.2015.12.017

[8] Sarah Denford, Charles Abraham, Rona Campbell , Heide Busse. A Comprehensive Review of Reviews of School-Based Interventions to Improve Sexual-Health. Health Psychol Rev 11 (1), 33-52 Mar 2017. PMID: 27677440 DOI: 10.1080/17437199.2016.1240625

[9] Ankur Singh, Shalini Bassi, Gaurang P Nazar, Kiran Saluja, MinHae Park, et al. Impact of School Policies on Non-Communicable Disease Risk Factors - A Systematic Review BMC Public Health 17 (1), 292 2017 Apr 4 PMID: 28376833 PMCID: PMC5379668 DOI: 10.1186/s12889-017-4201-3

[10] Nichola Shackleton, Farah Jamal, Russell M Viner, Kelly Dickson, George Patton et al. School-Based Interventions Going Beyond Health Education to Promote Adolescent Health: Systematic Review of Reviews. J Adolesc Health 58 (4), 382-396 Apr 2016 PMID: 27013271 DOI: 10.1016/j.jadohealth.2015.12.017

[11] Maureen Dobbins, Heather Husson, Kara DeCorby, Rebecca L LaRocca. School-based Physical Activity Programs for Promoting Physical Activity and Fitness in Children and
Adolescents Aged 6 to 18 Cochrane Database Syst Rev (2), CD007651 2013 Feb 28 PMID: 23450577 DOI: 10.1002/14651858.CD007651.pub2

[12] Michelle O'Reilly, Nadzeya Svirydzenka, Sarah Adams, Nisha Dogra. Review of Mental Health Promotion Interventions in Schools. Soc Psychiatry Psychiatr Epidemiol 53 (7), 647-662 Jul 2018. PMID: 29752493 PMCID: PMC6003977 DOI: 10.1007/s00127-018-1530-1

[13] C Bonell, H Wells, A Harden, F Jamal, A Fletcher, et al. The Effects on Student Health of Interventions Modifying the School Environment: Systematic Review. J Epidemiol Community Health 67 (8), 677-81 Aug 2013 PMID: 23682106. DOI: 10.1136/jech-2012-202247

[14] POST, 2018 Parliamentary Office of Science and Technology (2018*). Health in Private-Rented Housing.* Available at: http://researchbriefings.files.parliament.uk/documents/POST-PN-0573/POST-PN-0573.pdf

[15] Alderton A, Villanueva K, O'Connor M, Boulangé C, Badland H. Reducing Inequities in Early Childhood Mental Health: How Might the Neighborhood Built Environment Help Close the Gap? A Systematic Search and Critical Review. Int J Environ Res Public Health. 2019 Apr 29;16(9). pii: E1516. doi: 10.3390/ijerph16091516.

[16] Singh A, Daniel L, Baker E, Bentley R. Housing Disadvantage and Poor Mental Health: A Systematic Review. Am J Prev Med. 2019 Aug;57(2):262-272. doi: 10.1016/j.amepre.2019.03.018.

[17] Ige J, Pilkington P, Orme J, Williams B, Prestwood E, et al. The relationship between buildings and health: a systematic review. J Public Health (Oxf). 2019 Jun 1;41(2):e121-e132. doi: 10.1093/pubmed/fdy138.

[18] Thomson H, Thomas S, Sellstrom E, Petticrew M. Housing improvements for health and associated socio-economic outcomes. Cochrane Database Syst Rev. 2013 Feb 28;(2):CD008657. doi: 10.1002/14651858.CD008657.pub2.

[19] Chapman R, Preval N, Howden-Chapman P. How Economic Analysis Can Contribute to Understanding the Links between Housing and Health. Int J Environ Res Public Health. 2017 Aug 31;14(9). pii: E996. doi: 10.3390/ijerph14090996.

Equally, housing of poor quality is increasingly linked to poor physical and mental health[20] and wellbeing across all ages, and has been linked as a cause or contributor to a number of preventable respiratory and cardiovascular diseases and injuries.

Wales has the oldest and, proportionately, the highest treatment costs associated with poor housing in the UK[21]. Findings from the latest Welsh Housing Conditions survey[22] estimate that 18% of the housing stock contains a deficiency posing a health and safety risk to the occupant (Welsh Government, 2018). Housing which is not energy efficient can lead to excess cold and related health conditions, as well as financial hardship for the occupiers. Using the latest profiles of housing conditions and updating the methodology in line with the more recent Full Cost of Poor Housing[23] report to reflect improved understanding of poor housing impacts, it is estimated that poor quality housing in Wales costs the NHS more than £95m per year[24]. Looking more widely at the costs to society as a whole, which takes into account the wider impacts of housing related illness and injuries, such as distress, reduced economic potential, life-long care and increased burden on welfare finances, the full cost of poor housing in Wales is over £1bn.

The National Institute for Health and Care Excellence Quality Standard QS117[25] covers the prevention of excess winter deaths and health problems associated with cold homes. Cold weather has a variety of effects on people's health including direct effects on the incidence of heart attack, stroke, respiratory disease, influenza, falls and injuries and hypothermia. Furthermore, there are indirect effects of cold and damp weather, for example mental health problems including depression.

Strong as some evidence appears to be concerning living environment and health, some systematic reviews have published the caveat that the data, at

[20] Reeves A, Clair A, McKee M, Stuckler D. Reductions in the United Kingdom's Government Housing Benefit and Symptoms of Depression in Low-Income Households. Am J Epidemiol. 2016 Sep 15;184(6):421-9. doi: 10.1093/aje/kww055. Epub 2016 Sep 8.

[21] Nicol S, Roys M, Ormandy D and Ezratty V (2017). *The cost of poor housing in the European Union*. BRE. Watford

[22] Welsh Government (2018). *Welsh Housing Conditions Survey 2017-18: Headline Report.* Available at: https://gweddill.gov.wales/docs/statistics/2018/181206-welsh-housing-conditions-survey-headline-report-2017-18-en.pdf

[23] Roys M, Nicol S, Garrett H, and Margoles S (2016). *The full cost of poor housing.* Watford: HIS BRE Press.

[24] Nicol S and Garret H (2019). *The cost of poor housing in Wales, 2017.* BRE. Watford

[25] NICE (2016). *Preventing excess winter deaths and illness associated with cold homes.* Available at: https://www.nice.org.uk/guidance/qs117/chapter/introduction.

present, are not tremendously robust and that more research is required[26], [27], [28].

Relative Poverty and Health. From NICE[29], through the Royal College of Paediatrics and Child Health[30] and onto the Health Foundation[31] and the Jason Rowntree Trust, there is a rich evidence base that looks at the impact of poverty on heath; particularly mental health. If further evidence is needed, then the UK Millennium Cohort Study has published many papers tracking the effect of poverty on child and maternal health. This study has also enabled much more timely tracking of the health consequences and emerging trends in responses to such global economic issues such as the "Great Recession"[32] while other groups have tracked the austerity that followed[33]. There is no escaping the observation that poverty and ill health are closely linked.

The association between work and health and the effect that work has on health is well documented. Indeed, there is an international, peer reviewed journal[34] that looks specifically at occupational and environmental medicine and offers research and policy insights across a range of areas from analysis of exposures and their effect on health through to mental health related to work and the linkages between social value and in-work poverty to ill health. The Government takes industrial health seriously as evidenced by the presence of the health and safety executive[35] that investigates lapses in work safety and the more recent enacting of measures that have made industrial incidents the subjects of possible criminal investigation. The economic cost of

[26] Bird EL Ige JO, Pilkington P, Pinto A, Petrokofsky C et al. Built and natural environment planning principles for promoting health: an umbrella review. BMC Public Health. 2018 Jul 28;18(1):930. doi: 10.1186/s12889-018-5870-2.

[27] Hunter RF, Cleland C, Cleary A, Droomers M, Wheeler BW, et al. Environmental, health, wellbeing, social and equity effects of urban green space interventions: A meta-narrative evidence synthesis. Environ Int. 2019 Sep;130:104923. doi: 10.1016/j.envint.2019.104923. Epub 2019 Jun 19.

[28] T H M Moore, J M Kesten, J A López-López, S Ijaz A McAleenan et al. The Effects of Changes to the Built Environment on the Mental Health and Well-Being of Adults: Systematic Review. Health Place;53: 237-257. Sep 18. PMID: 30196042 DOI: 10.1016/j.healthplace. 2018.07.012

[29] https://www.evidence.nhs.uk/search?q=poverty+and+health accessed on 20 Jan 2020.

[30] https://www.rcpch.ac.uk/sites/default/files/2018-04/poverty20and20child20health20survey20-20views20from20the20frontline20-20final2008.05.20171.pdf accessed 20 Jan 2020.

[31] https://www.health.org.uk/infographic/poverty-and-health accessed on 28 Jan 2020.

[32] Caoimhe McKenna, Catherine Law, Anna Pearce. Increased household financial strain, the Great Recession and child health—findings from the UK Millennium Cohort Study. BMJ Open. 2017; 7(3): e015559. Published online 2017 Mar 9. doi: 10.1136/bmjopen-2016-015559 PMCID: PMC5353316 PMID: 28280000

[33] Luis Rajmil David Taylor-Robinson Geir Gunnlaugsson Anders Hjern Nick Spencer. Trends in social determinants of child health and perinatal outcomes in European countries 2005–2015 by level of austerity imposed by governments: a repeat cross-sectional analysis of routinely available data. BMJ Open. 2018; 8(10): e022932. Published online 2018 Oct 12. doi: 10.1136/bmjopen-2018-022932 PMCID: PMC6194462 PMID: 30317184

[34] https://oem.bmj.com/content/early/recent accessed on 28 Jan 2020.

[35] https://www.hse.gov.uk/ accessed 28 Jan 2020.

days lost through sickness and injury great. In 2016, the ONS reported that 136 million days were lost from work[36]. This was estimated to have cost to the economy of over £100 billion[37].

Investment in Social Care Services. There has been a historic link between the services offered by the social and health care sectors[38] with health benefits being linked to the degree of positive investment[39], [40]. Recently, the cycle has gone full circle with health and social services coming back into on[41]e department of state. The evidence does demonstrate how specialist social workers and services can improve health[42] and lower the cost of services[43], [44]. That being said, there are issues associated with how the value of the social investment can be quantified[45], [46]. There is good evidence, however, from a variety of Social Return on Investment Studies from high income countries that have demonstrated positive cost effectiveness in health promotion, mental health, sexual and reproductive health, child health, nutrition, healthcare management, health education and environmental health[47], [48]. In addition to the selected references already cited, there is a rich literature and long history of peer reviewed publication covering social determinants, social work and social care services which

[36] https://www.ons.gov.uk/news/news/totalof137millionworkingdayslosttosicknessandinjuryin 2016 accessed 25 Jan 2020.

[37] https://www.gov.uk/government/news/a-million-workers-off-sick-for-more-than-a-month accessed 25 Jan 2020.

[38] Houlihan J, Leffler S. Assessing and Addressing Social Determinants of Health: A Key Competency for Succeeding in Value-Based Care. Prim Care. 2019 Dec;46(4):561-574. doi: 10.1016/j.pop.2019.07.013. Epub 2019 Jul 31.

[39] Thorpe KE, Joski P. Association of Social Service Spending, Environmental Quality, and Health Behaviors on Health Outcomes. Popul Health Manag. 2018 Aug;21(4):291-295. doi: 10.1089/pop.2017.0136. Epub 2017 Nov 15.

[40] Lauren A. Taylor, Annabel Xulin Tan, Caitlin E. Coyle, Chima Ndumele, Erika Rogan, et al. Leveraging the Social Determinants of Health: What Works? PLoS One. 2016; 11(8): e0160217. Published online 2016 Aug 17. oi: 10.1371/journal.pone.0160217 PMCID: PMC4988629 PMID: 27532336

[41] Nichols LM, Taylor LA. Social Determinants As Public Goods: A New Approach To Financing Key Investments In Healthy Communities. Health Aff (Millwood). 2018 Aug;37(8):1223-1230. doi: 10.1377/hlthaff.2018.0039.

[42] McCullough JM, Singh SR, Leider JP. The Importance of Governmental and Nongovernmental Investments in Public Health and Social Services for Improving Community Health Outcomes. J Public Health Manag Pract. 2019 Jul/Aug;25(4):348-356. doi: 10.1097/PHH.0000000000000856.

[43] Steketee G, Ross AM, Wachman MK. Health Outcomes and Costs of Social Work Services: A Systematic Review. Am J Public Health. 2017 Dec;107(S3):S256-S266. doi: 10.2105/AJPH.2017.304004.

[44] McCullough JM, Curwick K. Local Health and Social Services Spending to Reduce Preventable Hospitalizations. Popul Health Manag. 2020 Jan 13. doi: 10.1089/pop.2019.0195. [Epub ahead of print]

[45] McCullough JM. Local health and social services expenditures: An empirical typology of local government spending. Prev Med. 2017 Dec;105:66-72. doi: 10.1016/j.ypmed.2017.08.018. Epub 2017 Sep 4.

[46] Leck C, Upton D, Evans N. Social Return on Investment: Valuing health outcomes or promoting economic values? J Health Psychol. 2016 Jul;21(7):1481-90. doi: 10.1177/1359105314557502. Epub 2014 Nov 28.

[47] Banke-Thomas AO, Madaj B, Charles A, van den Broek N. Social Return on Investment (SROI) methodology to account for value for money of public health interventions: a systematic review. BMC Public Health. 2015 Jun 24;15:582. doi: 10.1186/s12889-015-1935-7.

[48] Chapman R, Preval N, Howden-Chapman P. How Economic Analysis Can Contribute to Understanding the Links between Housing and Health. Int J Environ Res Public Health. 2017 Aug 31;14(9). pii: E996. doi: 10.3390/ijerph14090996.

frequently brings into the wider domain areas for discussion in terms of social issues relating to health[49], [50], [51].

Models of Care. When circumstances conspire to make individuals unhealthy, those in rural environments will have more barriers to accessing their care. Factors include distance to treatment facilities and transport availability. However, once the individual has got to the clinic there are other barriers to accessing care such as level of service provided, who provides it and whether the right people can be recruited and retained. Addressing these issues requires considerable thought at all levels from Government down to the clinical coal face. However, one thing is certain: "Successful models of population health must not myopically focus on care delivery but must also engage partners across their communities to address community culture as well as the broader social determinants of health. Use of team-based care, targeted population interventions, and creativity in redesigned incentives are core competencies necessary to effectively change the way health care is delivered across populations."[52]

Service Delivery Transformation Options. There a many solutions that have been offered when considering how to transform service delivery to keep up with changing need. However, within all of the numerous solutions there are two fundamental tracks that are discussed; increasing use of technology and the people proposition including recruiting and retention and changing the composition of the Multi-Disciplinary Team (MDT).

Use of Technology. When distance to healthcare facilities becomes problematic alternative means of meeting expressed needs must be explored. The Royal Australian Flying Doctor Service has a long history of providing radio enabled consultations. Rural Canadian populations have also seen the introduction of telemedical consultations. While face to face consultation is seen as the gold standard in patient centered service delivery, there is good evidence that suggests internet enabled consultations are

[49] International social work. https://journals.sagepub.com/toc/iswb/current accessed on 02 Feb 2020.

[50] Journal of Social Work. https://journals.sagepub.com/toc/jswa/current accessed 02 Feb 2020.

[51] Qualitative Social Work https://journals.sagepub.com/toc/qswa/current accessed 02 Feb 2020.

[52] "Lisa P Shock. Models of Population Health. Prim Care 46 (4), 595-602 Dec 2019 DOI: 10.1016/j.pop.2019.07.011 PMID: 31655755.

acceptable for patients, effective and safe[53], [54], [55], [56]. However, while use of technology is gaining acceptance around the world, the UK is still not exploiting the opportunities that technology offers[57], [58], [59].

Recruiting and Retention. For some years there have been discussions about the recruitment and development of staff in rural health care. The research in the field can was summarized by the University of Birmingham[60] in a report that suggested that rural areas are characterised by the disproportionate out-migration of young adults and in-migration of families and older adults. This is compounded by the organisational reality of the NHS that the conventional health service delivery model is one of a pyramid of services with fully-staffed specialist services in central (generally urban) locations – which are particularly attractive to workers who wish to specialise and advance their careers.

For those who choose rural practice a critical factor is familiarity with rural life. The next ost important factor appears to be to give individuals from an urban background significant exposure to rural working through placements or secondments. Evidence exists that suggests that exposing students and training grade healthcare providers to the opportunities of rural practice has a positive effect on whether these groups will choose rural care as a career

[53] Khan I, Ndubuka N, Stewart K, McKinney V, Mendez IThe use of technology to improve health care to Saskatchewan's First Nations communities. Can Commun Dis Rep. 2017 Jun 1;43(6):120-124. eCollection 2017 Jun 1.

[54] Seto E, Smith D, Jacques M Morita PP. Opportunities and Challenges of Telehealth in Remote Communities: Case Study of the Yukon Telehealth System. JMIR Med Inform. 2019 Nov 1;7(4):e11353. doi: 10.2196/11353.

[55] Goodridge D, Marciniuk D. Rural and remote care: Overcoming the challenges of distance. Chron Respir Dis. 2016 May;13(2):192-203. doi: 10.1177/1479972316633414. Epub 2016 Feb 21.

[56] Natalie K Bradford, Liam J Caffery, Anthony C Smith.Telehealth Services in Rural and Remote Australia: A Systematic Review of Models of Care and Factors Influencing Success and Sustainability. Rural Remote Health. 16 (4), 3808. Oct-Dec 2016

[57] Pappas Y, Vseteckova J, Mastellos N, Greenfield G, Randhawa G..Diagnosis and Decision-Making in Telemedicine. J Patient Exp. 2019 Dec;6(4):296-304. doi: 10.1177/2374373518803617. Epub 2018 Oct 8.

[58] Edwards HB, Marques E, Hollingworth W, Horwood J, Farr M, et al. Use of a primary care online consultation system, by whom, when and why: evaluation of a pilot observational study in 36 general practices in South West England. BMJ Open. 2017 Nov 22;7(11):e016901. doi: 10.1136/bmjopen-2017-016901.

[59] Kayyali R, Hesso I, Mahdi A, Hamzat O, Adu A et al. Telehealth: misconceptions and experiences of healthcare professionals in England. Int J Pharm Pract. 2017 Jun;25(3):203-209. doi: 10.1111/ijpp.12340. Epub 2017 Mar 6.

[60] Green, A., Bramley, G., Annibal, I. and Sellick, J. 2018. Rural Workforce Issues in Health and Care. University of Birmingham Archive

option[61], [62], [63], [64], [65]. This seems to be congruent with the observations of those students who have been attached to practices in Powys.

Evidence from Australia also suggested that while reasons for moving out of, or not entering, rural practice were the deciding factors in a healthcare workers employment decision, there were, in fact more positive reasons to stay than negative. The conclusion was obvious, although difficult to implement in that strategies must be developed that advertise more strongly the positive reasons for making rural practice the chosen career move[66],[67],[68].

An obvious approach to recruitment would be to recruit as many staff as possible from the local area. Whilst many organisations acknowledge this the evidence base for successful "Grow your own" initiatives is quite sparse. One clear example would be the Lincolnshire Talent Academy, established in April 2016 to deliver proactive services to aid recruitment and skills development of the workforce[69]. The experiences of the Lincolnshire Talent Academy would certainly warrant more detailed engagement in order to inform the possible development of a Powys Teaching Academy.

A model may exist where clinicians who are retired or considering retirement might be attracted to work perhaps part time in Powys. This approach has been explored in rural France in areas of the country that have been described as "medical deserts"[70]. For example in Laval, a rural town of

[61] Thackrah RD, Hall M, Fitzgerald K, Thompson SC. Up close and real: living and learning in a remote community builds students' cultural capabilities and understanding of health disparities. Int J Equity Health. 2017 Jul 6;16(1):119. doi: 10.1186/s12939-017-0615-x.

[62] Lee YH, Barnard A, Owen C Initial evaluation of rural programs at the Australian National University: understanding the effects of rural programs on intentions for rural and remote medical practice. Rural Remote Health. 2011;11(2):1602. Epub 2011 May 13.

[63] Evans J, Lambert T, Goldacre M GP recruitment and retention: a qualitative analysis of doctors' comments about training for and working in general practice. Occas Pap R Coll Gen Pract. 2002 Feb;(83):iii-vi, 1-33.

[64] Jennene A Greenhill, Judi Walker, Denese Playford. Outcomes of Australian Rural Clinical Schools: A Decade of Success Building the Rural Medical Workforce Through the Education and Training Continuum. Rural Remote Health. 15 (3), 2991. Jul-Sep 2015. PMID: 26377746

[65] M C Spiers, M Harris. Challenges to Student Transition in Allied Health Undergraduate Education in the Australian Rural and Remote Context: A Synthesis of Barriers and Enablers. Rural Remote Health 15 (2), 3069. Apr-Jun 2015 PMID: 25916254

[66] N Campbell, L McAllister, D Eley. The Influence of Motivation in Recruitment and Retention of Rural and Remote Allied Health Professionals: A Literature Review. Rural Remote Health 12, 1900 2012 PMID: 22845190

[67] Rosalie D Thackrah, Sandra C Thompson. Learning From Follow-Up of Student Placements in a Remote Community: A Small Qualitative Study Highlights Personal and Workforce Benefits and Opportunities. BMC Med Educ; 19 (1), 331. 2019 Sep 4. PMID: 31484513 PMCID: PMC6727324 . DOI: 10.1186/s12909-019-1751-3

[68] Tony Smith Keith Sutton, Sabrina Pit, Kuda Muyambi, Daniel Terry et al. Health Professional Students' Rural Placement Satisfaction and Rural Practice Intentions: A National Cross-Sectional Survey. Aust J Rural Health 26 (1), 26-32 Feb 2018. PMID: 28815895 . DOI: 10.1111/ajr.12375

[69] https://www.lincstalentacademy.org.uk/ accessed on 27 Jan 2020.

[70] Pierron, JR. 2017: France: new government, new focus on medical deserts? https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(17)30138-X/fulltext

50,000 residents in Western France healthcare is now provided by 12 veteran doctors, aged between 67 and 70, working out of the ground floor of an apartment bloc[71]. Indeed, this option was discussed at the 2019 RCGP Annual Conference when several GPs approaching retirement spoke of a desire to continue to practice on a long term, peripatetic, locum basis in Wales.

Expanding the Multidisciplinary Team. In recent years there has been increased interest in the UK in bringing non-physician providers into clinical practice and encouraging these new providers to practice to the 'top of their license' such providers include Nurse Practitioners (NP), Physicians Assistants (PA), Pharmacists, Opticians and, most recently, medical technicians and paramedics. For the purpose of this review, data concerning NPs, PAs and Pharmacists. PAs and NPs have an enlarging portfolio of published evidence to show their effectiveness, efficacy and acceptance into the evolving multidisciplinary team[72], [73]. By being able to provide appropriate care, in most cases more quickly, to patients, they have freed up GPs to treat only the most complex cases that will benefit most from their training, education and experience[74].

PAs. Physician Assistant began to be developed in America during the 1960s[75] and considerable evidence now exists to support their safety and effectiveness[76], [77]. Physicians Assistants (PAs) have a long history of being used in the primary care setting in many countries,. However the role of the PA in UK practice is still evolving[78], [79] although to date, the evidence suggests that this new provider group offers an exciting opportunity to

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develop the primary care MDT[80], [81], [82]. Successful as the introduction of PAs (and indeed other new providers) into the primary care multidisciplinary team, there are barriers which need to be overcome particularly relating to scope of practice, training, education, governance and attitudes of other providers and patients[83], [84], [85]. That being said, there is an established evidence base from countries where the use of PAs is more established (which also mirrors the experience in Powys (yet to be published) suggests that with positive mentoring and a supportive practice, PAs can be successfully integrated into the MDT[86], [87], [88]. Indeed, there is an emerging opinion that PAs represent, perhaps, the best option in developing the primary care MDT[89].

NPs. With the acknowledgement in the literature globally, of the problems associated with sustainability of a doctor led healthcare service, attention has fallen on which other professional healthcare providers might be brought in the healthcare team. Within this milieu, the nurse practitioner has been seen as a major contributor to the primary care team for many years. Indeed, the first Cochrane review of the nurse practitioner was undertaken in 2005 and was updated in 2018. The 2018 review concluded that nurse practitioners, practice nurses, and registered nurses, probably provide equal or possibly even better quality of care compared to primary care doctors, and probably achieve equal or better health outcomes for patient, particularly in areas of

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patient satisfaction, compared to primary care doctors[90]. That being said, while the Cochrane review was entitled "Nurses and substitutes for doctors in Primary Care", there is no apparent trend to see nurse practitioners become independent clinicians[91], [92]. A second Cochrane study looking at the evidence concerning the role of the Nurse Practitioner also identified their value in primary care but further detailed the need to appropriate role description, training, and supervision[93].

Pharmacists. Further developing the theme of which providers might join the modern primary care MDT, much attention has also been paid to the role of the pharmacist in General Practice. This has fallen, broadly, into town areas; specialist pharmacist support to GP practices in the area of medicines management, prescription reviews and repeat prescribing and; the role of the pharmacist in a patient facing role[94], [95], [96], [97] with an additional theme, common to the discussions concerning freeing up GPs to be able to focus on the more complex cases[98], [99].

Within the practice environment, there is considerable evidence that pharmacist presence in the primary care MDT is valued from the perspectives

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of the MDT[100], [101], [102] as well as the public[103] although there some attitudinal barriers to using pharmacists to provide first line consultations with some groups still favouring seeing more traditional providers of first line services, particularly doctors[104].

As with the other new actors on the MDT stage, considerable thought is being put into the barreirs to bringing pharmacists into the team. As with the other players, these include attitudes of established members of the team, scope of practice, training, education[105], [106] governance, regulation, mentoring and cost[107], [108].

Conclusion. The is considerable evidence to support the introduction and development of new providers in the primary care MDT. In terms of; creating additional capacity and capability and releasing established members of the team to maximise their training, experience, expertise and experience by focussing on the most complex cases; enabling patients to access the healthcare pathway more quickly and be seen by the right person with the right training and skills at the right time. Key to this evolution of the MDT is describing the roles and responsibilities of the new actors on the stage and ensuring mentoring, training, education, communication and collaborative working are built into the new roles from the start. Something that is already being done in parts of Powys but not in all.

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Healthcare is expensive, costs are ever rising and the popular media frequently report issues associated with quality of care and funding[109], [110]. In parallel with reports concerning healthcare cost and consumption are publications that advocate investment in social determinants of health and how they might impact on the need for healthcare in the future[111].

Until relatively recently, there was little learned analysis of the effect of social investment on health[112]. That is changing in the Anglophone, high income countries[113], [114], [115] where there is an increasing body of published evidence that suggests general improvement in health outcomes can be generated by investment in health promotion and disease prevention, the social determinants of health and in front line social services[116], [117], [118], [119]. There is more detailed evidence showing improvement in such metrics as teenage pregnancy[120] and homicide rates[121] as well as adult obesity; asthma; mentally unhealthy days; days with activity limitations; and mortality rates for lung cancer, acute myocardial infarction, and type 2 diabetes[122]. There is even specific evidence how park use has a positive effect on health[123].

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This level of research and insight is yet to be established in the UK; perhaps it is about time it was as we continue to invest more in managing ill health while there is growing evidence that investing in wellbeing shows a cost effective social return of investment.