Supplementary File 2

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Research study and source reference	**ORQ1:** Do people living with multimorbidity and their carers have specific health and care requirements, including for **service coordination** that people with single morbidities, and their carers, either have to a lesser degree or not at all?		**ORQ2:** To what extent and how are these requirements met by commissioning and provision of health and care services? Who takes overall responsibility for the totality of care and support?			
	Did the research **ask** about specific health and care requirements for people with multimorbidity? If so, what?	Did the research **identify** specific health and care requirements for people with multimorbidity (or their carers) even if not prompted specifically to do so? If so, what?	Did the research **ask** how the innovation could meet, or fail to meet, the specific health and care needs of people with multimorbidity?	Whether or not specifically asked for, did the research **find evidence** about meeting the specific health and care needs of people with multimorbidity? If so, what?	Whether or not specifically asked for, did the research **find evidence** that a method/innovation (**dis-)advantages** people with multiple morbidity relative to people with single conditions? If so, how?	Did the research **ask** who takes overall responsibility for the totality of care, or for coordination of care?
Primary Care Networks Smith J, Parkinson S, Harshfield A, Sidhu M. Early evidence of the development of primary care networks in England: a rapid evaluation study. Health Soc Care Deliv Res 2022;10(27)	No, did not ask.	No.	No, did not ask.	Reasons for collaborative working typically include a desire for better integrated services, but in general rather than specifically for people living with multiple long-term conditions. One potential example was a diabetes clinic that also had social care workers in attendance; however, this service innovation was not attributed to the Primary Care Network per se but rather to good relationships between providers/sectors. The evaluation finds in the literature some claimed impacts of GP collaborations that include: enabling the delivery of pharmacy-led medication reviews in general practice or care homes; and intensive home support for people living with multiple complex conditions. Case study findings also include evidence of Primary Care Networks enabling general practices to come together to share services and create collective solutions to long-standing problems related to the sustainability of primary care, e.g. new practice-based pharmacy support and reviews for people using multiple medications.	No, but there are evidently expectations that some innovations of Primary Care Networks will particularly benefit people living with multiple long-term conditions - see preceding column.	No.
Acute hospitals managing general practice services – Phase 1 Sidhu M, Pollard J, Sussex J. Vertical integration of GP practices with acute hospitals in England and Wales: rapid evaluation. Health Soc Care Deliv Res 2022;10(17)	No, did not ask.	Vertical integration at case study site (Greenvale) was facilitated, at least in part, by the primary and acute care systems vanguard model of care introduced there in 2015, which focused on better managing care across primary and secondary care settings for patients with complex and multiple morbidities.	No, did not ask.	A major finding was that vertical integration sustains GP practices at risk of closing. People with multiple long-term conditions use GP services more frequently than other patients and so should benefit more in terms of convenience of access and continuity of primary care provider from keeping local GP practices open. There were notable differences between the case study sites in organisational and clinical integration. Closer organisational integration was attributed to previous good relationships between primary and secondary care locally, and to historical planning and preparation towards integrated working across the local health economy. Closer clinical integration is likely to be even more important for people with multiple long-term conditions than for others; but it was not evident if any of this clinical integration was <u>across</u> pathways (of particular benefit to people with multiple long-term conditions rather than single conditions) rather than <u>along</u> single condition pathways. Found that innovations introduced included: sharing information in real time across primary and secondary care at one case study site; at another case study site targeting high-risk patients with multiple morbidities who are most likely to access emergency secondary care but could be better managed in the community; and at another site an innovation of GPs and other healthcare professionals being located together in a single hub, which was potentially even more beneficial to people with multiple long-term conditions than to other patients.	No.	No.
Children and Young People's Mental Health Trailblazers Ellins J, Hocking L, Al-Haboubi M, Newbould J, Fenton S-J, Daniel K et al. Early evaluation of the Children and Young People's Mental Health Trailblazer programme: a rapid mixed-methods study. Southampton: NIHR Health and Social Care Delivery Research Topic Report; 2023. DOI: 10.3310/hsdr-tr-130818	The research asks if there are groups of children and young people who are more challenging to reach, or who may not be benefitting from the programme. This includes people with a mental health need and a disability, for example. However, it is challenging to identify these children within the data. Also, the programme was designed to support children and young people without severe or complex needs.	No.	The research asked how the programme was currently serving children with complex needs, and if and how it might evolve in the future to meet those needs.	Care needs of children and young people with complex or severe needs were explicitly outside the remit of the programme, which was aimed at children and young people with mild to moderate mental health issues. Extrapolating this to wider learning about MLTCs is challenging, but there could potentially be similar patterns in other programmes where patients with multiple or complex care needs fall outside the scope of more narrowly tailored programmes, particularly where paraprofessional staff are used and their training is limited to the purposes of the programme.	By design, the Trailblazers programme did not meet the needs of children and young people with complex conditions, while providing care to CYP with mild to moderate needs and no other co-occuring conditions.	One role of the mental health support teams is to coordinate referrals across education, mental health and voluntary sector organisations. The research asked if the mental health support teams were fulfilling this goal, but this concerns all children and young people with mild to moderate mental health conditions and was not specific to those with multiple long-term conditions.
Telephone first primary care for people with multiple conditions Saunders CL, Gkousis E. Impact of telephone triage on access to primary care for people living with multiple long-term health conditions: rapid evaluation. Health Soc Care Deliv Res 2022;10(18)	No, did not ask.	Found that during the COVID-19 pandemic people living with multiple long-term conditions were more likely to have a problem that meant that they needed to see a GP compared with people with no long-term conditions, or a single condition.	Yes, the research questions are: • RQ1: Considering people living with multiple long-term health conditions only, does a telephone triage approach affect how quickly people can see or speak to an appropriate primary care professional? • RQ2: What is the size of that effect relative to the effect on people contacting a GP practice who do not have multiple long-term health conditions? • RQ3: Are there any subgroups of the population with multiple long-term health conditions who are particularly affected (either positively or negatively) in terms of how quickly they see or speak to an appropriate primary care professional, both generally and when a telephone triage approach is used?	The study focused on access and found no evidence of differential access. Found that during COVID-19 people living with multiple long-term conditions were more likely to have a problem that meant that they needed to see a GP compared with people with no long-term conditions, or a single condition. But found no evidence that there was any difference in whether someone with multimorbidity or not tried to access a GP if they did have a problem, whether they were able to make an appointment, or whether the appointment they got was face-to-face or by telephone or online.	Found that there are differences in the time taken to see or speak to an appropriate primary care professional among people with multimorbidity compared with people without, both before and after the introduction of telephone triage. But these differences are small compared with the overall improvement in time taken for all patients when a practice switches to a telephone triage approach.	No.
COVID Oximetry at Home main evaluation Fulop N, Walton H, Crellin N, Georghiou T, Herlitz L, Litchfield I et al. A Rapid Mixed Methods Evaluation of Remote Home Monitoring Models During the COVID-19 Pandemic in England. Southampton: NIHR Health and Social Care Delivery Research Topic Report; 2022	No, did not ask.	No.	No.	No distinction in any of the analyses or findings between people with multiple long-term conditions and other people using pulse oximetry at home.	No.	No.
COVID Oximetry at Home in care homes Sidhu M, Litchfield I, Miller R, Fulop NJ, Janta B, Tanner J-R, et al. Using pulse oximeters in care homes for residents with COVID-19 and other conditions: a rapid mixed-methods evaluation. Health Soc Care Deliv Res 2022;10(35)	No, did not ask.	No, but the research found that residents with dementia required a different approach to using the pulse oximeter than other residents.	No, the evaluation was of pulse oximetry for residents in care homes. That population contains many with multiple morbidities but the focus was the setting not the presence or absence of multiple long-term conditions.	No.	No advantage or disadvantage for people with multiple long-term conditions was found.	No.
Artificial intelligence and social care Glasby J, Litchfield I, Parkinson S, Hocking L, Tanner D et al. New and emerging technology for adult social care - the example of home sensors with artificial intelligence (AI) technology. Southampton: NIHR Health and Social Care Delivery Research Topic Report; 2022. DOI: 10.3310/hsdr-tr-134314	No, but many actual and potential service users would have been living with multiple long-term conditions.	No.	Whether service users were living with multiple long-term conditions was not an explicit dimension of the evaluation, but many service users are living with dementia.	No.	No.	No.
Digital first primary care as experienced by people with multiple conditions and their carers Newbould J, Hocking L, Sidhu M, Daniel K. Digital first primary care for those with multiple long-term conditions: The views of stakeholders. Health Soc Care Deliv Res 2023 (under review)	Yes, the research asks for health care professionals' and other stakeholders' views of the experience of digital first primary care for patients with multiple long-term conditions, their carers and health care professionals, both before and during the COVID-19 pandemic.	Yes. People living with multiple long-term conditions need online question algorithms and protocols to be written so that they allow for multiple conditions, not merely a single condition, being relevant to the issue.	Yes the research asks: • What is the impact of Digital First Primary Care on the nature of consultations for carers/patients with multiple long-term conditions from the perspectives of health professionals and stakeholders, which includes aspects such as the health professional(s) spoken to, timeliness of care, and continuity of care? • What, if any, are the advantages or disadvantages of Digital First Primary Care for patients with multiple long-term conditions, and their carers, as reported by health professionals and stakeholders? • What lessons can be learnt from staff and stakeholders, for future service delivery for patients with multiple long-term conditions in primary care? Are there individual groups within the community where there is particular learning for future service provision?	The way Digital First Primary Care is implemented can affect service provision for people with multiple long-term conditions, e.g. by either enabling or impeding care continuity when scheduling appointments online. Carers of people with multiple long-term conditions have mixed experiences: in some ways digital first gives them more access (e.g. they can access services remotely), but they may also have more hoops to jump through (e.g. consent forms, access requirements). It is not clear whether this differs for carers of people with multiple long-term conditions compared with other carers.	Digital first tends to suit those with a single condition with a simple story. It is less suitable when patients need to use the system to convey more complex needs. Algorithms used for triage do not always work well for people with complex needs (e.g. may too often divert patients to emergency services). They also do not allow for any type of relationship between the GP and patient that might contextualise results that are outside the normal population range but are not a cause for concern for that particular patient (e.g. a high pain score not being a cause for concern for a particular patient). Some healthcare professionalss say they prefer to see people who have multiple long-term conditions face to face, so as to have the opportunity to holistically assess the patient. If people with multiple long-term conditions find the digital systems unsuitable and consequently divert to phone based access, this gives them differential services, but whether they are disadvantaged by this is not clear. Despite being designed for everyone, Digital First Primay Care is most used by the patients who are most digitally literate. Digital first systems tend to be used less by those who are older, who are also more likely to have multiple long-term conditions. There is some evidence of digital self-management tools being used to improve care for people with multiple long-term conditions. It is not clear whether carers of people with multiple long-term conditions were advantaged or disadvantaged relative to other carers.	No but the research does ask how digital first approaches in primary care impact on care coordination, and if/how this affects people with multiple long-term conditions.
Acute hospitals managing general practice services – Phase 2 Sidhu M, Saunders CL, Davies C, McKenna G, Wu F, Litchfield I, Olumogba F, Sussex J. Vertical integration of GP practices with acute hospitals in England: rapid impact evaluation. Health Soc Care Deliv Res 2023 (under review)	Not directly. But research sought the impact of vertical integration on people with multiple long-term conditions compared with other patients, whatever the specific needs of people with multiple long-term conditions.	No.	Yes: in staff and patient interviews.	Found examples of service innovations in vertically integrated practices that were focused particularly on supporting people with multiple long term conditions; but it is unclear whether they would have happened also in the absence of vertical integration. At two case study sites, vertical integration provided new opportunities to assess the needs and outcomes of individuals with multiple long term conditions and support those needs through a coordinated and holistic approach using a multidisciplinary team model, and enhanced access to specialists and disease-specific clinics. The coordinated approach to treat patients with complex needs at both sites signalled a drive to improve patient care while simultaneously aiming to reduce Accident and Emergency department attendances.	Found no evidence of any difference in the impact of vertical integration on hospital utilisation between patients with multiple long term conditions and other patients.	No.
Women's reproductive health hubs Daniel K, Bousfield J, Hocking L, Jackson L, Taylor B. Evaluation of Women's Health Hubs. Health Soc Care Deliv Res 2023 (under review)	No, hubs are not designed for long-term conditions.	No.	No.	Some parallels between women's reproductive health as defined for hubs and caring for people with multiple long-term conditions. E.g. that care provision is not well integrated; that a one-stop-shop or hub-and-spoke model would be useful; that complex and fragmented commissioning arrangements for women's health are frequently identified as obstacles to providing effective and holistic women's health care; 8/12 Hubs answering the survey have an objective "to enable multiple issues to be addressed in the same appointment"; and 11/12 have an objective "to provide holistic care to women [within the scope of reproductive health services]".	No.	Not with respect to people with multiple long-term conditions. Research did ask who leads each Hub.

	ORQ3: How effectively and cost-effectively are these requirements being met?		**ORQ4:** To what extent are people with multimorbidity being supported to design, coordinate and manage their own care?		**ORQ5:** How do services aimed at people with multiple long-term conditions affect inequalities in access to care and inequalities in health; and how are these services' impacts affected by inequalities (of all kinds)?		
Whether or not specifically asked for, did the research **find evidence about** who takes overall responsibility for the totality of care, or for coordination of care? If so, who?	Did the research **ask** about effectiveness and/or cost-effectiveness related to meeting health and care needs for people with multimorbidity?	Whether or not specifically asked for, did the research **find evidence** about the effectiveness and/or cost-effectiveness related to meeting health and care needs for people with multimorbidity? If so, what?	Did the research **ask** about whether and how people with multimorbidity are being supported to design, coordinate and manage their own care?	Whether or not specifically asked for, did the research **find evidence** about whether and how people with multimorbidity are being supported to design, coordinate and manage their own care? If so, what?	Did the research **ask** about inequalities related to services aimed at people with multimorbidity? If so, what?	Whether or not specifically asked for, did the research **find any evidence** related to inequalities in access or outcomes for services aimed at people with multimorbidity? If so, what?	Did the research **find evidence** that services for people with multimorbidity are affected by inequalities? If so, what?
Not evident.	No.	Not evident.	No.	Not evident.	No, did not ask.	Not evident.	No.
Not evident.	No.	Not evident.	No.	Not evident.	No, did not ask.	Not evident.	No.
The research focused on whether mental health support teams and education mental health practitioners are coordinating referrals across services. It did not look more broadly to see if others had a coordinating role. Some Trailblazer sites were actively setting up 'hubs' or 'single point of contact' systems in order to better coordinate referral and care. It seems that much of this 'boundary spanning' occurred through happenstance in that it was mediated by people who had social network ties due to past employment across sectors or connections derived through other activities/experiences.	No.	Not evident.	The research asked about how children and young people, and their carers, are being supported to design and manage their care, but it was not specific to children and young people with multiple long-term conditions.	The innovation is not aimed at children and young people with multiple long-term conditions. The evaluation found that the involvement of young people, parents and carers in the design and delivery of the innovation was variable and often low, despite it being an aspiration that they be involved throughout the programme.	The research asked about inequalities, but this was not specific to people living with multiple long-term conditions.	The research found evidence related to access to services for various groups of children and young people but these were not specific to those with multiple long-term conditions.	No.
Not evident.	The research asked about the effectiveness of the innovation for facilitating access to care for people with multiple long-term conditions.	The research found that the innovation improved access for all patients, including those with multiple long-term conditions.	No.	Not evident.	Yes: whether inequalities impacted access to care, and how telefirst affected this.	Where there is heterogeneity it is between practices much more than within them, which implies the heterogeneity stems from its implementation rather than the technology itself. Found little evidence across most measures of access to primary care, both before and during the COVID-19 pandemic, that particular groups of people living with multimorbidity had differentially better or worse experiences of primary care access when considering age, sex, ethnicity, deprivation, rurality, employment, or shielding status. This does not mean that disparities do not exist. For example, overall in the population during 2020 people living in low-income households reported greater need for healthcare. However, these disparities appear to impact people living with multiple long-term health conditions in a similar way to people without. The one exception we found to this was about the relationship between patient age, multimorbidity and the time taken to see or speak to a GP or other appropriate primary care professional: people age 85 and over were able to see or speak to a GP more quickly the more long-term health conditions they were living with.	No.
Not evident.	No.	Not evident.	No.	Oximetry was not focused on people with multiple long-term conditions. But it was about supporting patients to stay in their own homes or in care homes, which implies they or their carers were being supported to manage their care. Patients and carers reported positive experiences (93% rated the service as good or excellent) and felt that services and human contact received as part of these services reassured them and were easy to engage with. Findings indicated that patients with COVID-19 can engage with remote monitoring services but may require support from staff and family/friends to do so. Findings indicate that burden of treatment may be experienced by patients and families with acute conditions.	No, did not ask.	Not evident.	No.
No, the research focused on a single diagnostic - pulse oximeters - and what to do when that indicates a problem, namely care workers call in NHS emergency care. Evaluation noted that care workers sometimes felt it was beyond their training to decide when to call in NHS emergency care.	No.	No, but becaust the diagnostic is low cost and easy to use and effective, it is likely to be cost-effective. But this is not specific to people with multiple long-term conditions.	No.	Oximetry was not focused on people with multiple long-term conditions. But it was about supporting patients to stay in their care homes, which implies they or care home workers were being supported to manage their care. Care home staff usually found oximetry easy to use and helpful for managing care home residents care.	No, did not ask.	No mention made at any of 6 case study sites of particular issues of inequalities for subgroups of people with multiple long-term conditions.	No.
Although not specific to service users living with multiple long-term conditions, the company that makes the technology was collecting heart rate data but the social workers implementing the technology said they did not want this data because they did not want the responsibility to decide when and how to act on it as this is something they had not been not trained for.	No.	Not evident.	No.	Evaluation found that in general people who draw on care and support, and their carers, expressed interest in how the technology might impact on their care and the shared decision-making associated with it. This included concerns that using the technology at home might reduce social care provided by care staff, and might erode choice and control (for example, a feeling that analysis by the technology might drive what care is provided, rather than the person being able to exercise a degree of choice and control). Thus by supporting self-management the innovation might reduce the care received.	No, did not ask.	Not evident.	No.
No, although it is evident that (informal) carers in practice take on some of this responsibility.	Research asked about perceptions of effectiveness for people with multiple long-term conditions. But digital first primary care was not designed to tackle the particular requirements of people with multiple long-term conditions. Research did not address cost-effectiveness.	Pros and cons found. No assessment of effectiveness overall or of cost-effectiveness.	No.	Not evident.	The research asks if there are particular conditions, combinations of conditions, or types of patients who are favoured by digital first primary care or for whom this approach is less appropriate (e.g. older patients, those without digital access).	Patients without digital access or with poor digital literacy are likely to use alternative routes to access primary care. Unclear what effect this has on access or outcomes overall.	Those without access to the internet, or poor digital literacy, are disadvantaged. These groups includes highly deprived populations and the elderly.
No.	Only indirectly: patients interviewed (all living with multiple long-term conditions) had the opportunity to indicate whether/how far their needs are being met.	No.	No.	Not evident.	No, did not ask.	Vertical integration took place in a range of locations, which on average had similar to national average deprivation levels. No particular impacts on inequalities were found in analyses, but these were focused on general population effects (for people with and without multiple long-term conditions), rather than on effects in particular population subgroups.	Vertical integration took place in a range of locations, which on average had similar to national average deprivation levels. No particular impacts on services of inequalities were noted in the qual or quant analyses, but these were not focused on detecting the impact of inequalities.
No, but found that 7/12 Hubs that responded to the survey are GP led, compared to 4/12 being specialist led and one with shared leadership. Leadership focus is not holistic, but rather is limited to the scope of (not long-term) women's reproductive health services.	No.	Not evident.	No.	No, but one case study of a hub for women's (non-long-term) reproductive health care included some self-management support for women.	No, did not ask.	Not evident.	No.