Norway grants

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The role of digital tools in patient centered health services for frail elderly with chronic multi-morbidity: A Scoping Review

Report on summary of findings

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Objective

The aim of this scoping review is to identify different ways that digital tools are used in patient centered health services for frail elderly with chronic multi-morbidity within different care settings: acute, primary, and home care. Introduction: Digital tools can play various roles in a health care service ranging from an operationalization tool that enables scaling of the service to an integral component of the service that provides value disregarding the scale. There have been efforts for more than two decades for creating innovative models of delivering health care services to frail elderly with chronic multi-morbidity with varying degrees of success. Understanding how digital tools can contribute to successful innovative models of care plays an important role in future endeavors in this area.

Methods

Search strategy

The search strategy was developed in collaboration with a research librarian. We searched the databases Embase (via Ovid), Medline (via Ovid), CINAHL (via EBSCO) and Web of Science for papers published since 2013 till date of search. An example of the search strategy is presented in the appendix. The search strategy was adapted to each database.

All search results (2944) were exported to Endnote and duplicates removed following the method by Bramer et al (1). After de-duplication, the title and abstracts were screened using Rayyan (2). All abstracts (2220) were screened by at least two researchers, independently of one another. Discrepancies were resolved by discussion. A total of 145 abstracts were included in the initial screening and full texts were obtained and the papers further assessed for eligibility.

	CINAHL	**Embase**	**Medline**	**WoS**	**Total**
Exported from database	636	1534	323	451	2944
Removed as duplicate					724
Total in initial inclusion review	620	1342	0	258	2220

Table 1:Summary of de-duplication.

Eligibility and data extraction

The overarching inclusion criteria was to include empirical studies that have implemented a patient-centered intervention supported by digital components. More specifically we only included studies where 1) the population was frail multimorbid elderly, 2) the intervention was patient-centered, i.e. the intervention was developed based on patients' goals, values, and needs.

We excluded studies that:

1. Were published before 2010.
2. Focused on single disease.
3. Were published as conference proceedings.
4. Were screening studies, e.g. development and evaluation of frailty screening tools.
5. Used telephone calls for follow-ups as their technology component.
6. Used or video not for videoconferencing but only for showing instructions, e.g. exercise routines.
7. Used digital technology but not as a component of the intervention but for recruitment, data collection, medical education, or analysis of patient journal data.

In the next step we extracted the following data from the selected articles:

1. Evidence source details and characteristics:
   1.1. Country
   1.2. Context (primary, acute, community, or home care)
   1.3. Participants (age, sex and numbers)
2. Results:
   2.1. What makes the intervention patient-centred?
   2.2. How are digital tools used?
   2.3. How do digital tools contribute to the patient-centered aspect of the intervention?
   2.4. Outcomes reported.

Results

Full text review of 112 of 145 articles is completed at the moment and so far 16 articles have met the inclusion criteria. The following diagram shows the screening process:

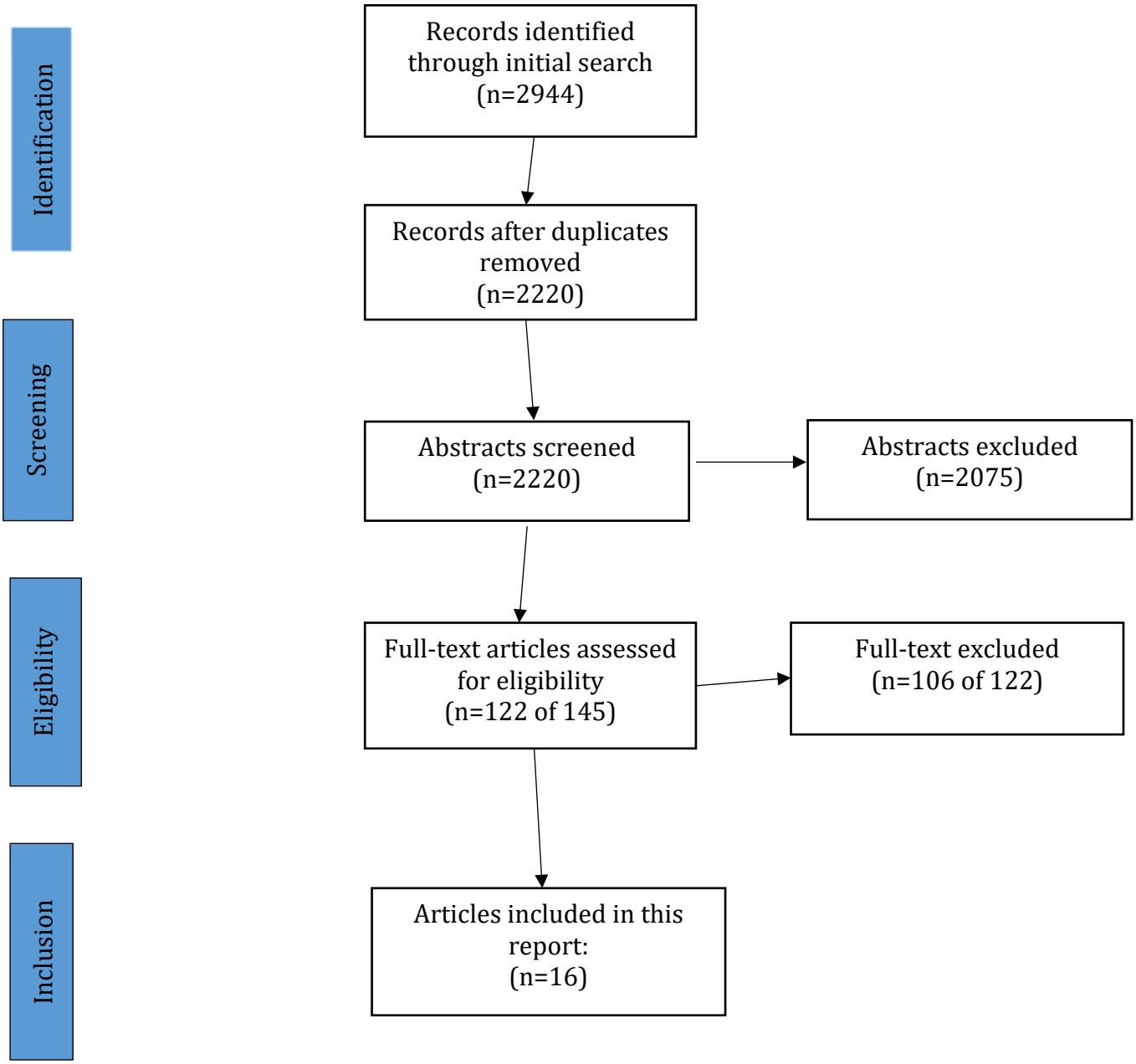

Figure 1:Screening process

Publication year

The 16 included articles have been published between 2013 and 2022:

Publication year	Number of references	Citation
2013	1	– Lexis M, Everink I, Van Der Heide L, Spreeuwenberg M, Willems C, De Witte L.
2014	2	– Makai P, Perry M, Robben SH, Schers H, Heinen M, Olde Rikkert MG, et al. (2 articles)
2015	1	– Pedone C, Rossi FF, Cecere A, Costanzo L, Antonelli Incalzi R.
2016	1	– Donate-Martinez A, Rodenas F, Garces J.
2017	3	– Geraedts HAE, Zijlstra W, Wei Z, Spoorenberg SLW, Báez M, Far IK, et al. – Kajander M, Storm M. – Lewis C, Moore Z, Doyle F, Martin A, Patton D, Nugent LE.
2018	2	– Willard S, Cremers G, Man YP, van Rossum E, Spreeuwenberg M, de Witte L. – Walker PP, Pompilio PP, Zanaboni P, Bergmo TS, Prikk K, Malinovschi A, et al.
2021	5	– Doyle J, Murphy E, Gavin S, Pascale A, Deparis S, Tommasi P, et al. – de Batlle J, Massip M, Vargiu E, Nadal N, Fuentes A, Bravo MO, et al. – Lang C, Roessler M, Schmitt J, Bergmann A, Holthoff-Detto V. – Lapao LV, Peyroteo M, Maia M, Seixas J, Gregorio J, Mira da Silva M, et al. – Perez-Rodriguez R, Villalba-Mora E, Valdes-Aragones M, Ferre X, Moral C, Mas-Romero M, et al.
2022	1	– Bhatia R, Gilliam E, Aliberti G, Pinheiro A, Karamourtopoulos M, Davis RB, et al.

Table 2:Year of publicaion

Study design

Among 16 included article 39% were observational studies designed to evaluate outcomes. Process evaluation studies focusing on formative evaluation of the end-to-end process of design and implementation of the intervention comprised 17 % of the studies. Feasibility studies stood also at 17%. Randomized controlled studies formed 11% of the studies, sharing the same percentage with cross-sectional mixed-method studies. Action research proof-of-concept studies took the smallest share at 5%.

Study design	Number of references	Citation
Outcome evaluation (observational studies)	7	– Kajander M, Storm M.2017. – de Batlle J, Massip M, Vargiu E, Nadal N, Fuentes A, Bravo MO, et al.2021. – Perez-Rodriguez R, Villalba-Mora E, Valdes-Aragones M, Ferre X, Moral C, Mas-Romero M, et al.2021. – Lexis M, Everink I, Van Der Heide L, Spreeuwenberg M, Willems C, De Witte L.2013. – Makai P, Perry M, Robben SH, Schers H, Heinen M, Olde Rikkert MG, et al.2014.

		– Donate-Martinez A, Rodenas F, Garces J.2016. – Lewis C, Moore Z, Doyle F, Martin A, Patton D, Nugent LE.2017.
Process evaluation	3	– Makai P, Perry M, Robben SH, Schers H, Heinen M, Olde Rikkert MG, et al.2014. – Willard S, Cremers G, Man YP, van Rossum E, Spreeuwenberg M, de Witte L..2018. – Lapao LV, Peyroteo M, Maia M, Seixas J, Gregorio J, Mira da Silva M, et al.2021.
Feasibility study	2	– Geraedts HAE, Zijlstra W, Wei Z, Spoorenberg SLW, Báez M, Far IK, et al.2017. – Lang C, Roessler M, Schmitt J, Bergmann A, Holthoff-Detto V.2021.
Randomized controlled trial	2	– Pedone C, Rossi FF, Cecere A, Costanzo L, Antonelli Incalzi R.2015. – Walker PP, Pompilio PP, Zanaboni P, Bergmo TS, Prikk K, Malinovschi A, et al.2018.
Cross-sectional mixed-methods study	1	– Bhatia R, Gilliam E, Aliberti G, Pinheiro A, Karamourtopoulos M, Davis RB, et al.2022.
Action research Proof-of-Concept trial	1	– Doyle J, Murphy E, Gavin S, Pascale A, Deparis S, Tommasi P, et al.2021.

Table 3:Study design

The following two sections present two summary tables. First table provides the context and participants in the studies, and the second table focuses on the intervention itself.

Evidence source details and characteristics

The following table summarizes the context and participants in the 16 included studies:

Citation	Country	Context	Participants
Lexis M, Everink I, Van Der Heide L, Spreeuwenberg M, Willems C, De Witte L. Activity monitoring technology to support homecare delivery to frail and psychogeriatric elderly persons living at home alone. Technology and Disability. 2013;25(3):189-97.	Netherland	Home care	19 frail multi-morbid patients older than 65 years. 16 informal care givers and 16 formal care givers
Makai P, Perry M, Robben SH, Schers H, Heinen M, Olde Rikkert MG, et al. Which frail older patients use online health communities and why? A mixed methods process evaluation of use of the health and welfare portal. Journal of Medical Internet Research. 2014;16(12):e278-e.	Netherland	Primary care	290 frail multi-morbid patients
Makai P, Perry M, Robben SH, Schers HJ, Heinen MM, Olde Rikkert MG, et al. Evaluation of an eHealth intervention in chronic care for frail older people: why adherence is the first target. Journal of medical Internet research. 2014;16(6):e156.	Netherland	Primary care	290 frail multi-morbid patients
Pedone C, Rossi FF, Cecere A, Costanzo L, Antonelli Incalzi R. Efficacy of a physician-led multiparametric telemonitoring system in very old adults with heart failure. Journal of the American Geriatrics Society. 2015;63(6):1175-80.	Italy	Outpatient clinic	Multi-morbid individuals with heat failure as the main diagnosis aged 65 and older (mean age 80) randomly assigned to intervention (n = 50) or control (n = 46).
Donate-Martinez A, Rodenas F, Garces J. Impact of a primary-based telemonitoring programme in HRQOL, satisfaction and usefulness in a sample of older adults with chronic diseases in Valencia (Spain). Archives of Gerontology and Geriatrics. 2016;62:169-75.	Spain	Primary care	74 frail mult-imorbid elderly
Geraedts HAE, Zijlstra W, Wei Z, Spoorenberg SLW, Báez M, Far IK, et al. A Home-Based Exercise Program Driven by Tablet Application and Mobility Monitoring for Frail Older Adults: Feasibility and Practical Implications. Preventing Chronic Disease. 2017;14:1-10.	Netherland	Home care	Forty transitionally frail and in-dependently living adults participated; 15 were men. Mean age at intake was 81 years (min age 70)
Kajander M, Storm M. «Kontakt med ett trykk»: hjemmeboende brukeres erfaringer med videosamtaler. Nordic Nursing Research / Nordisk Sygeplejeforskning. 2017;7(1):6-20.	Norway	Home care	14 frail multi-morbid elderly btween 56-90 years old

Lewis C, Moore Z, Doyle F, Martin A, Patton D, Nugent LE. A community virtual ward model to support older persons with complex health care and social care needs. Clinical Interventions in Aging. 2017;12:985-93.	Ireland	Home care	45 frail multi-morbid elderly. Age: 81.6±5.7 years
Willard S, Cremers G, Man YP, van Rossum E, Spreeuwenberg M, de Witte L. Development and testing of an online community care platform for frail older adults in the Netherlands: a user-centred design. BMC Geriatrics. 2018;18(1):1-.	Netherland	Home care	17 frail older adults > 65 years old
Walker PP, Pompilio PP, Zanaboni P, Bergmo TS, Prikk K, Malinovschi A, et al. Telemonitoring in chronic obstructive pulmonary disease (chromed) a randomized clinical trial. American Journal of Respiratory and Critical Care Medicine. 2018;198(5):620-8.	Spain, United Kingdom, Slovenia, Estonia, and Sweden	Home care	312 patients between 66-76 years old. Patients were randomized to usual care (n = 158) or telemonitoring (n = 154)
Doyle J, Murphy E, Gavin S, Pascale A, Deparis S, Tommasi P, et al. A Digital Platform to Support Self-management of Multiple Chronic Conditions (ProACT): Findings in Relation to Engagement during a One-Year Proof-of-Concept Trial. Journal of Medical Internet Research. 2021;23(12):e22672.	Ireland and Belgium	Home care	120 patients Ireland: 60 patients Age: 74.23 ± 6.4 (65-92 years) Belgium: 60 patients Age: 73.61 ± 6.49. (60-91)
de Batlle J, Massip M, Vargiu E, Nadal N, Fuentes A, Bravo MO, et al. Implementing Mobile Health?Enabled Integrated Care for Complex Chronic Patients: Intervention Effectiveness and Cost-Effectiveness Study. Jmir Mhealth and Uhealth. 2021;9(1):9.	Spain	Home care	A total of 48 patients were included in the integrated care arm and 28 patients receiving usual care were included in the control arm (mean age 82 years, SD 7 years; mean Charlson index 7, SD 2)
Lang C, Roessler M, Schmitt J, Bergmann A, Holthoff-Detto V. Health-related quality of life in elderly, multimorbid individuals with and without depression and/or mild cognitive impairment using a telemonitoring application. Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation. 2021.	Germany	Primary care	Nine GPs recruited 177 individuals, 97 of whom were included in the HRQoL analysis. Age>65 years old
Lapao LV, Peyroteo M, Maia M, Seixas J, Gregorio J, Mira da Silva M, et al. The implementation of digital monitoring services for patients with chronic diseases during the Covid-19 pandemic: A design science approach. Journal of medical Internet research. 2021.	Portugal	Primary care	53 health professionals and selected group of patients > 60 years in the codesign team
Perez-Rodriguez R, Villalba-Mora E, Valdes-Aragones M, Ferre X, Moral C, Mas-Romero M, et al. Usability, User Experience, and Acceptance Evaluation of CAPACITY: A Technological Ecosystem for Remote Follow-Up of Frailty. Sensors (Basel, Switzerland). 2021;21(19).	Spain	Home care	46 frail multi-morbid elderly >70 years old, living at home
Bhatia R, Gilliam E, Aliberti G, Pinheiro A, Karamourtopoulos M, Davis RB, et al. Older adults' perspectives on primary care telemedicine during the COVID-19 pandemic. Journal of the American Geriatrics Society. 2022;70(12):3480-92.	US	Primary care clinics	208 frail multi-morbid adults > 65 years old

Table 4:Study characteristics

Summary of results

The following table summarizes answers to the questions that this review aims to respond to in addition to the outcomes reported in the 18 included studies.
The questions that we aimed to answer in this review were:

1. What makes the intervention patient-centred?
2. How are digital tools used?
3. How do digital tools contribute to the patient-centered aspect of the intervention?

Citation	What makes the intervention patient-centred?	How are digital tools used?	Digital tools contribution to patient-centerdness	Outcomes reported
Lexis M, Everink I, Van Der Heide L, Spreeuwenberg M, Willems C, De Witte L. Activity monitoring technology to support homecare delivery to frail and psychogeriatric elderly persons living at home alone. Technology and Disability. 2013;25(3):189-97.	Not clearly stated	Remote monitoring of daily activites	Not clearly stated	No significant changes were found on the patient questionnaires. A significant decrease in subjective burden of informal caregivers was found between T0 and T2 (p=0.03). Formal caregivers stated that QuietCare enabled them to provide more tailored care
Makai P, Perry M, Robben SH, Schers H, Heinen M, Olde Rikkert MG, et al. Which frail older patients use online health communities and why? A mixed methods process evaluation of use of the health and welfare portal. Journal of Medical Internet Research. 2014;16(12):e278-e.	Not clearly stated	The digital tool is an online health community that patients use primarily for messaging and in addition for goal-setting function, and defining care-related activities to reach their goals	Helping patients to set personal goals and define and track activities for achieving those goals	Of 622 frail patients in the intervention group, 290 were connected to the online tool; 79 used it regularly (at least monthly). Main predictors for use were having an informal caregiver, having problems with activities of daily living, and having a large number of providers. From 23 interviews, main reasons for use were perceiving the online community to be a good, quick, and easy way of communicating with providers and the presence of active health problems. Important reasons for non-use were lack of computer skills and preferring traditional means of consultation
Makai P, Perry M, Robben SH, Schers HJ, Heinen MM, Olde Rikkert MG, et al. Evaluation of an eHealth intervention in chronic care for frail older people: why adherence is the first target. Journal of medical Internet research. 2014;16(6):e156.	Patients needs and feedbacks were considered in the design and testing of the online community tool	The digital tool is an online health community that patients use primarily for messaging and in addition for goal-setting function, and defining care-related activities to reach their goals	Helping patients to set personal goals and define and track activities for achieving those goals	There were 290 patients in the intervention group and 392 in the control group. Of these, 76/290 (26.2%) in the intervention group actively used the tool After 12 months follow-up, we observed no significant improvement on primary patient outcomes. ADL improved in the intervention group with a standardized score of 0.21 (P=.27)
Pedone C, Rossi FF, Cecere A, Costanzo L, Antonelli Incalzi R. Efficacy of a physician-led multiparametric telemonitoring system in very old adults with heart failure. Journal of the American Geriatrics Society. 2015;63(6):1175-80.	Telemonitoring scheduling could be remotely altered to adapt to the changing needs of the patient	Telemonitoring system (receives and communicates oxygen saturation, heart rate, and blood pressure readings)	By having the flexibility to adapt to the changing needs of patient	Outcome measures were hospital admissions for any reason or death 180 days from enrollment. Incidence of the main outcome was 42% in the control group and 21% in the intervention group (relative risk = 0.51, 95% confidence interval (CI) = 0.26–0.98). The results were unchanged after taking into account the setting of enrollment, sex, and disability (hazard ratio = 0.42, 95% CI = 0.19–0.94).
Donate-Martinez A, Rodenas F, Garces J. Impact of a primary-based telemonitoring programme in HRQOL, satisfaction and usefulness in a sample of older adults with chronic diseases in Valencia (Spain). Archives of Gerontology and Geriatrics. 2016;62:169-75.	Not clearly stated	Telemonitoring and telecare	Not clearly stated	The whole sample experienced improvement, although not significant, of its HRQOL; patients over 75 showed impairment. Patients with at least one problem in the EQ-5D dimensions decreased after one year (82.43% vs. 74.32%). Users' perceptions of satisfaction and usefulness were highly positive.
Geraedts HAE, Zijlstra W, Wei Z, Spoorenberg SLW, Báez M, Far IK, et	Not clearly stated	Sensors and tablet are used to deliver a	Not clearly stated	Twenty-one of 40 enrolled participants completed the trial. Adher- ence overall was 60.9%

al. A Home-Based Exercise Program Driven by Tablet Application and Mobility Monitoring for Frail Older Adults: Feasibility and Practical Implications. Preventing Chronic Disease. 2017;14:1-10.		home-based exercise program		(average of 3 bouts per week). Adherence. among completers (69.2%) was significantly higher than adher- ence among dropouts (49.9%). Adherence was sufficient among completers during the 3 months of supervision (75.8%). Adher- ence to wearing the sensor was 66.7% and was significantly high- er among completers than among dropouts (75.7% vs 54.2%). The rate of incidents was significantly lower among completers than among dropouts (0.4 vs 1.2 incidents per participant per week). Connectivity-related incidents were prominent. On a scale of 1 to 5, completers gave ratings of 4.3 (after 3 months) and 4.2 (after 6 months).
Kajander M, Storm M. «Kontakt med ett trykk»: hjemmeboende brukeres erfaringer med videosamtaler. Nordic Nursing Research / Nordisk Sygeplejeforskning. 2017;7(1):6-20.	Not clearly stated	Virtual visits (video-conferencing)	Not clearly stated	The findings showed that the users experienced the virtual visits with professionals as a physical encounter; it was almost like talking «face-to-face». The virtual visits appeared to provide an easy opportunity to talk with qualified healthcare professionals that had sufficient time and to be able to ask questions and get advice about health concerns.
Lewis C, Moore Z, Doyle F, Martin A, Patton D, Nugent LE. A community virtual ward model to support older persons with complex health care and social care needs. Clinical Interventions in Aging. 2017;12:985-93.	Not clearly stated	Telemonitoring and telecare enabling Community Virtual Wards (CVW)	Not clearly stated	here was a reduction in ED presentations post-CVW admission (P,0.001), and median unscheduled admissions were reduced (P=0.001). Those living alone had a lower number of ED presentations (median 0.5, interquartile range 0–1) prior to admission in comparison to those living with a caregiver, with no differences observed during admission to CVW. For those who experienced a fall during CVW admission, the odds ratio (OR) of requiring long-term care doubled for each extra fall (OR =2.24, 95% CI 1.11 to 4.52, P=0.025). Reduced cognition was associated with an increased risk of ED presentations (ρ=0.292, P,0.05) but not associated with increased risks of unplanned hospital admissions (ρ=0.09, P=0.546). There were no sig-nificant correlations seen between admission avoidance and the number of unplanned hospital admissions or ED presentations.
Willard S, Cremers G, Man YP, van Rossum E, Spreeuwenberg M, de Witte L. Development and testing of an online community care platform for frail older adults in the Netherlands: a user-centred design. BMC Geriatrics. 2018;18(1):1-.	Using a user-centred design approach where patients were involved all steps of the developing an online health platform for frail multi-morbid elderly	An online platform that is mostly used for messaging , access to information and managing contacts	The overall prospect was that an theplatform can contribute to the social participation and the self-management competencies of frail older adults, together with their social cohesion in the community	An iterative process of modifications resulted in an interactive software concept on a Standard PC, containing 11 Functions. The Functions of 'contacts', 'services' and 'messaging', were by far, the most frequently used. The use was at its highest during the first 2 weeks of the testing and then its use steadily declined. The vast majority of the subjects (94%) were positive about the usability of the platform. Only a minority of the subjects (27%) indicated that the platform had added value for them.
Walker PP, Pompilio PP, Zanaboni P, Bergmo TS, Prikk K, Malinovschi A, et al. Telemonitoring in chronic obstructive pulmonary disease	Not clearly stated	Telemonitoring	Not clearly stated	Primary outcomes were time to first hospitalization (TTFH) and change in the EuroQoL EQ-5D utility index score. Secondary outcomes included: rate of antibiotic/corticosteroid prescription; hospitalization; the COPD Assessment Tool, Patient Health

(chromed) a randomized clinical trial. American Journal of Respiratory and Critical Care Medicine. 2018;198(5):620-8.				Questionnaire-9, and Minnesota Living with Heart Failure questionnaire scores; quality-adjusted life years; and healthcare costs. Telemonitoring did not affect TTFH, EQ-5D utility index score, antibiotic prescriptions, hospitalization rate, or questionnaire scores. In an exploratory analysis, telemedicine was associated with fewer repeat hospitalizations (254%; P = 0.017).
Doyle J, Murphy E, Gavin S, Pascale A, Deparis S, Tommasi P, et al. A Digital Platform to Support Self-management of Multiple Chronic Conditions (ProACT): Findings in Relation to Engagement during a One-Year Proof-of-Concept Trial. Journal of Medical Internet Research. 2021;23(12):e22672.	Using user participation in design and development of the prototype.	The digital health platform helps older adults with self-managing multimorbidity, with support from their care network.	Allowing users to set self-management goals and create plans for achieving them.	Of the 120 participants who participated, 24 (20%) withdrew before the end of the study, whereas 3 (2.5%) died. The remaining 93 participants actively used the platform until the end of the trial, on average, taking 2 or 3 health readings daily over the course of the trial in Ireland and Belgium, respectively. The participants reported ProACT to be usable and of low burden. Findings from interviews revealed that participants experienced multiple benefits as a result of using ProACT, including improved self-management, health, and well-being and support from the triage service. For those who withdrew, barriers to engagement were poor health and frustration when technology, in particular sensing devices, did not work as expected.
de Batlle J, Massip M, Vargiu E, Nadal N, Fuentes A, Bravo MO, et al. Implementing Mobile Health?Enabled Integrated Care for Complex Chronic Patients: Intervention Effectiveness and Cost-Effectiveness Study. Jmir Mhealth and Uhealth. 2021;9(1):9.	Not clearly stated	Digital sensors integrated into a self-management mobile app	Enabling and supporting self-management	A total of 48 patients were included in the integrated care arm and 28 patients receiving usual care were included in the control arm (mean age 82 years, SD 7 years; mean Charlson index 7, SD 2). Integrated care patients showed a significant increase in the SF-12 physical domain with a mean change of +3.7 (SD 8.4) (*P*=.004) and total SF-12 score with a mean change of +5.8 (SD 12.8) (*P*=.003); however, the differences in differences between groups were not statistically significant. Integrated care patients had 57% less unplanned visits (*P*=.004) and 50% less hospital admissions related to their main chronic diseases (*P*=.32). The integrated care program generated savings in different cost scenarios and the ICER demonstrated the cost-effectiveness of the program.
Lang C, Roessler M, Schmitt J, Bergmann A, Holthoff-Detto V. Health-related quality of life in elderly, multimorbid individuals with and without depression and/or mild cognitive impairment using a telemonitoring application. Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation. 2021.	Not clearly stated	Telemonitoring ad telecare	Engagement of individuals with vital data measurements via telemonitoring applications which are in line with the treat- ment regimen of the GP may increase the mental HRQoL	Nine GPs recruited 177 individuals, 97 of whom were included in the HRQoL analysis. Significantly lower physi- cal and mental component summary (PCS/MCS) scores were revealed in study participants with depression, and with both depression and MCI, compared to participants with no mental disorders. PCS scores did not differ between study dates, but MCS scores had significantly increased over time. Participants' engagement with measurements was significantly associated with an increased MCS score, but not with the PCS score.
Lapao LV, Peyroteo M, Maia M, Seixas J, Gregorio J, Mira da Silva M, et al. The implementation of	Using user participation in design and development of the prototype.	Telemonitoring and telecare	Not clearly stated	The digital platform was developed for the specific objectives of the project and successfully piloted in 3 primary health care centers in the

digital monitoring services for patients with chronic diseases during the Covid-19 pandemic: A design science approach. Journal of medical Internet research. 2021.				Lisbon Health Region. Health professionals (n=53) were able to remotely manage their first patients safely and thoroughly, with high degrees of satisfaction.
Perez-Rodriguez R, Villalba-Mora E, Valdes-Aragones M, Ferre X, Moral C, Mas-Romero M, et al. Usability, User Experience, and Acceptance Evaluation of CAPACITY: A Technological Ecosystem for Remote Follow-Up of Frailty. Sensors (Basel, Switzerland). 2021;21(19).	Using user participation in design and development of the prototype.	Telemonitoring and telecare	The digital tools in this study enable preventative personalized early interventions	Forty-six participants used CAPACITY for six months; nine dropped out, leaving a final sample of 37 subjects. SUS reached a maximum averaged value of 83.68 after six months of use; no statistically significant values have been found to demonstrate that usability improves with use, probably because of a ceiling effect. UEQ, obtained averages scores higher or very close to 2 in all categories. TAM reached a maximum of 51.54 points, showing an improvement trend
Bhatia R, Gilliam E, Aliberti G, Pinheiro A, Karamourtopoulos M, Davis RB, et al. Older adults' perspectives on primary care telemedicine during the COVID-19 pandemic. Journal of the American Geriatrics Society. 2022;70(12):3480-92.	Not clearly stated	Telecare	Not clearly stated	Of 278 eligible patients reached, 208 completed the questionnaire; mean age was 74.4 years (±4.4), 61.5% were female, 91.4% were non-Hispanic White, 64.4% had ≥1 comorbidity, and 47.2% had a phone-only visit. Regard-less of their age, participants reported being satisfied with telemedicine; median score was 6.0 on the 7-point scale (25th percentile = 5.0 and 75th per- centile = 7.0). Non-Whites satisfaction scores were on average 1 point lower than those of non-Hispanic Whites (p = 0.02). Those with comorbidity reported scores that on average were 0.5 points lower than those without comorbidity (p = 0.07). Overall, 39.5% felt their telemedicine visit was worse than in-person care; 4.9% thought it was better

Table 5:Summary of results