

Supplementary Table S1. Detailed Characteristics of Included Studies

AUTHOR, YEAR	STUDY NAME OR SETTING	PATIENT CHARACTERISTICS	RMT USED AND PHYSIOLOGIC DATA GATHERED	MODE OF DATA COLLECTION AND TRANSMISSION	MODE OF DATA ACCESS AND REVIEW	INFORMANT CHARACTERISTICS AND METHODS USED TO GATHER PERSPECTIVES
Abraham and Rosenthal <sup>13</sup> (2008)	VHA Office of Care Coordination Care and Coordination Home Telehealth Program	Veteran patients with CHF, COPD, DM, or HTN and/or surgical, pressure, or vascular wound care management; high utilization of primary care and hospitalization; multiple medications; home environment conducive to remote monitoring	The Health Buddy devices and the Viterion 100 collected BP, blood oxygen, blood glucose, weight, temperature, heart rate, oxygen intake, and peak bodily fluids flow.	Data were transmitted via telephone lines. Health Buddy data were available the following morning via system down-/uploads daily at 2 a.m. Viterion 100 data were made available immediately upon patient submission.	Web interface provided access to patient data, including <i>ad hoc</i> and standardized reports; data-querying capabilities; alerts for reported abnormalities; a log of the abnormality-specific communication automatically generated to assist the patient (i.e., call 911); and an audit trail documenting patient use (logging on and off). One nurse was in charge of central monitoring, and another responded to alerts and conducted home visits. The LCC created monthly summaries that appeared in the comments section of the clinic EHR. In the event of an abnormality (e.g., excessively high BP) the LCC alerted the patient's primary care clinician via the computerized physician order entry system.	Semistructured interviews with five VA medical personnel involved in the RMT program: the physician program director; the nurse LCC; the program support assistant; the prosthetics staff manager; and the data technician.
Fursse et al. <sup>14</sup> (2008)	A medium-sized primary care practice northwest of London, United Kingdom	51 patients with DM, CHF, or HTN were provided with an RMT unit for 12 weeks.	The RMT unit included a touchscreen device to allow manual entry of certain data (glucose) and attached peripheral devices as appropriate to the medical condition. CHF patients received weight scales, SpO <sub>2</sub> , and BP attachments; diabetes patients received a glucometer, and HTN patients received a BP unit.	Each patient was asked to enter daily physiological measurements into the unit. Data were sent via the participant's telephone line to a server held at the primary care practice.	Data could be accessed and viewed via a Web site. A data summary for each patient was created and hyperlinked into the patient's EHR. Threshold values were defined for alerts, and the primary practice healthcare team reviewed data for patients with alerts at regular case conferences. Data were reported on a weekly basis and reviewed for possible intervention every 2 weeks.	Reports user satisfaction of the primary healthcare team, but does not report methods used for gathering perspectives

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Gagnon et al. <sup>15</sup> (2006)	Project 1: Quebec City, Canada Project 3: Lorraine region, France	Project 1 (CLSC du Futur): 26 patients in the Quebec City metro area with COPD and cardiac insufficiency who needed homecare visits after hospitalization participated. Project 3: 30 patients in the Lorraine region of France were randomized into usual care or the experimental group.	Project 1: The patient's home was equipped with an RMT device that transmitted patient data to a central monitor located in the community health organization. Project 3: Experimental patients received "Diatelic" equipment, a remote surveillance system for patients with chronic kidney insufficiency who are on CAPD that collects data on weight, BP, and temperature.	Project 1: Data type and mode of transmission not specified. Data were transmitted to and stored at the central monitor located in the community health organization. Project 3: Patients randomized to the treatment group were equipped with a computer and Internet access that allowed direct transmission of health data and communication with the medical team. Patients transmitted information once daily via a secure Internet connection.	Project 1: One nurse served as a central monitor and analyzed data in the community health organization; alerts were generated for abnormal results. A second nurse was in charge of responding to alerts and conducting home visits. Homecare nurses were equipped with a laptop computer to access results remotely. Project 3: The medical team at the hospital received patient data using a secure Internet connection. "Health data were analyzed by an expert system that generated alerts if a potential problem was detected."	The authors of this article summarize the "lessons learned" and the views of personnel involved in three different models of remote healthcare services, two of which involved RMT. The methods used in the original studies for gathering informants' perspectives are not described. The primary sources are conference proceedings that we were not able to access; two were non-English publications.
Goodrich et al. <sup>16</sup> (2011)	SUH, an Internet-mediated walking program in two family practice clinics in a large U.S. healthcare system	Sedentary adult patients with CAD, DM, or BMI >25 kg/m <sup>2</sup> (clinically obese; mean age, 45.2 years; predominantly female; white; and well educated. 139 patients referred to SUH, 37 (27%) enrolled	Patients were asked to wear a pedometer to gather step-count data for 6 weeks.	Patients uploaded step-count data to the SUH server via the Internet.	Web-based system. Patients and providers were able to review a personalized Web site with step-count feedback, individualized goals, tailored motivational messages, and educational tips.	Program developers first elicited provider input into the features of the clinical interface. Following the intervention, semistructured interviews with six primary care physicians and seven medical assistants explored (a) attitudes and perceptions of using the interface with patients and (b) beliefs about the broader feasibility of using SUH within their clinical practice.

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Hardisty et al. <sup>17</sup> (2011) Peirce et al. <sup>27</sup> (2011)	Interviews with various clinical professionals, medical and informatics academics, and others with policy-level roles for healthcare IT or chronic disease, United Kingdom	COPD, CHF, or DM	Physiological variables included pulse rate and SpO <sub>2</sub> .	Patients measured their physiological variables and answered questions about symptoms. Patient information was then transmitted to a central database.	Transmitted data were inspected daily, usually by a nurse. Measurements that cross individually set thresholds prompted a phone call to the patient.	Mixed methods including literature review and focus groups with key informants ( <i>n</i> =26). Informants represented academic, clinical (specialist, generalist, consultant, and nursing), policymaking, telehealth, and medical technology development backgrounds.
Hicks et al. <sup>18</sup> (2009)	Home health agency in rural Midwestern United States	The sample included individuals with diagnoses of surgical aftercare, cardiovascular problems, lung problems, cancer, diabetes, and infections who were selected for monitoring by the home health agency (47 monitored patients, 47 controls).	An FDA Class II medical device that collects key vital signs (BP, heart rate, SpO <sub>2</sub> , temperature) and information on a series of questions on a patient's perceived health status	User information was automatically sent via a standard telephone line through secure and confidential means to the service center that provided the medical equipment.	Upon receipt of data from the individual patient, the service center forwards the information via secure transmission to the home health agency, where an RN retrieves the patient information and determines whether immediate action is needed or if routine care is adequate. The information and recommended action are provided to the staff member responsible for the patient's care. A summary of collected data is provided to the physician prior to the patient's next visit.	Interviews and Likert scale questions gathered perspectives of six home health agency staff: LPN, social worker, physical therapist, PT aide, speech therapist, and RN.
Kim et al. <sup>25</sup> (2011)	Qualitative study of user experience with ubiquitous healthcare in Korea	NR	NR	NR	NR	In-depth interviews with six MDs and five nurses about ubiquitous healthcare on subjective user experience, expectation, business prospects, and prerequisites for the success of the ubiquitous healthcare market. Clinicians practiced in public health centers ( <i>n</i> =2) and private medical institutions ( <i>n</i> =4). Nurses represented primary care clinics ( <i>n</i> =2), private medical institutions ( <i>n</i> =2), and a research center ( <i>n</i> =1).

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Kobb et al. <sup>19</sup> (2003)	VHA Rural Home Care Project, southern Georgia and north Florida, United States	High-use, high-cost Veterans ( <i>n</i> = 281). Top 5 diagnoses: HTN, CHF, COPD, DM, cardiac arrhythmias	Program staff selected remote monitoring equipment to meet specific patient needs. Equipment included an in-home messaging device, the Health Buddy from Health Hero Network, American Telecare's audiovideo units, the Aviva 1010SLX with peripheral vital sign monitoring, Wind Currents TeleYou 500 videophone, and the telephone.	Patients transmitted data from monitoring equipment via regular analog telephone service.	Project staff, including three care coordinators (two NPs and a social worker), monitored data.	Key informant interviews of 57 VA primary care providers with satisfaction surveys every 6 months. Duration of observation period not specified
Lamothe et al. <sup>24</sup> (2006)	Remote monitoring pilot project in urban and rural Manitoba and Quebec, Canada	COPD and cardiac insufficiency, HTN, and DM patients with a severe degree of illness or frequent emergency room visits and hospitalizations	Patients were equipped with a local monitor (HomMed Sentry; Honeywell) on which peripheral devices were permanently connected: scale, thermometer, sphygmomanometer, oximeter for SpO <sub>2</sub> , and pulse. Other peripherals could be connected. Weight, temperature, BP, SpO <sub>2</sub> , pulse, blood glucose, lung function, ECG, and blood clotting measures could be recorded as needed.	Patients were responsible for taking and sending the required measures daily. Data from the local monitor were transmitted wireless to Pa-net Canada, retransmitted to AT&T Canada, and then to the healthcare technocenter and intranet system. If the wireless connection failed, data could be sent using the patients' telephone line.	Data were read at a central monitor located in the primary care organization in Quebec, the Winnipeg Regional Agency in urban Manitoba, or the Manitou Health Office in rural Manitoba. A nurse was appointed at the central monitor to respond to alerts. Depending on circumstances, a telephone call was made, or a nurse was sent to patients' homes.	Conducted 82 individual interviews and 5 group interviews with personnel involved in the provision of RMT services (managers, partners, healthcare professionals NOS, and patients)
Langstrup <sup>20</sup> (2008)	Online asthma monitoring in 8 primary care practices in Denmark	Patients with asthma	LinkMedica, a Danish online asthma and allergy portal developed by AstraZeneca, to record and transmit peak flow readings	Patients entered peak flow readings in an online diary; patients were advised to log on from home each day.	The online diary was accessible through a personal log-in on the asthma and allergy Web portal. Healthcare personnel could log on and receive daily status updates via an online patient list. A decision support tool summarized control status, calculated asthma severity, and suggested an appropriate level of pharmaceutical treatment.	Ethnographic case study including semistructured interviews with eight clinicians and one nurse

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Liddy et al. <sup>21</sup> (2008)	A family health network in semirural eastern Ontario, Canada (this study was nested in a larger trial called the APTCare project)	Primary care clinicians selected 22 patients for the RMT program meeting the following criteria: age 50 + years and with life expectancy of >6 months, excluding severe cognitive impairment or language barriers. Patients in the APTCare study were the most frail or at-risk patients in the practice.	Monitoring technologies included a BP monitor, wired or wireless weight scale, wireless glucometer, wireless pulse oximeter, peak flow meter, and stethoscope chest piece.	Patients were instructed to use their units every morning. Data were transferred through patients' telephone lines to a secure server located at the manufacturer's data center. Data were then uploaded to a secure Web-based application (method not specified).	Providers could access and review patient information from any location with Internet access. APTCare services were delivered by a team of NPs and a pharmacist working as part of a multidisciplinary team with family practice physicians. Each NP had a patient load of 70, among whom 7 had RMT units. About 7% of NPs' time was spent on telehealth activities. The NPs monitored clinical data and could program individualized, patient-specific alert parameters. Alert options included detecting trends, out-of-range values, and if no data were sent for more than 24 h.	In-depth interviews with eight physicians, three NPs, and the pharmacist to elicit their experiences with the technology
Terschuren et al. <sup>22</sup> (2007)	A primary care practice in rural Germany (a larger study of the same intervention is reported by van den Berg et al. <sup>23</sup> )	Eight patients with heart failure or diabetes or at risk of developing glaucoma	Devices included a 1-lead ECG meter, electric scale, sphygmomanometer, tonometer, and blood glucose meter. Patients were asked to perform routine ECG measurements once a day and whenever they felt symptoms (e.g., chest pain, arrhythmias). Patients at risk of developing glaucoma were asked to send weekly measurements of the intraocular pressure, supplemented with BP and glucose measurements.	All data were transmitted to an RMT service center, which then transferred the data into the patient's digital file at the primary care clinic. Patients transmitted ECG readings to the data service center via phone. BP and weight data could be transferred immediately, or the device automatically transmitted the stored data at night.	RMT data transferred to the patient's digital file at the clinic were reviewed by the primary care clinician. The service center alerted the practice via fax when threshold values were exceeded. Based on the daily data transfer, the clinician was able to decide whether the patient should be asked to attend for further diagnostic tests, or if a patient needed an in-person home visit by the clinician.	A 2-month feasibility study of RMT based on home visits by a specially trained nurse to 20 elderly patients who would otherwise have been receiving home visits from their clinician; 8 of the 20 patients had RMT devices installed. Reports clinician perspectives; methods not described

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Thompson and Thielke <sup>11</sup> (2009)	University of Washington, Seattle	Older adults, NOS	NR	NR	NR	Focus groups with an unspecified number of health-care providers who work with older adults to elicit their perspectives on RMTs. The sample included healthcare personnel from nursing, medicine, PT, psychiatry, psychology, and massage therapy.
Ure et al. <sup>26</sup> (2012)	Four practices in lower-income areas of Lothian, Scotland, United Kingdom	27 patients with moderate/severe COPD and at risk of hospital admission	TELESCOT COPD telemonitoring service: patients used a touchscreen computer to record a validated daily symptom score, including FEV1 taken with Bluetooth-linked monitoring devices.	Data were transmitted via a dedicated broadband link to a call center.	Trained support staff at the call center would contact the patient or his or her primary care practice triggered by symptom score or if no data were submitted.	Semistructured interviews were used to explore the perceptions of 18 healthcare professionals (GPs, practice nurses, hospital-based respiratory nurses, nurse managers, physiotherapy managers, clinical managers. Focus groups were conducted with six community nurse managers. The informants were involved in the implementation of the RMT service or in providing clinical support for patients.
Van den Berg et al. <sup>23</sup> (2009)	AGNES-practice concept in rural Germany	Four different RMT devices were implemented in the homes of 48 patients for periods ranging from 3 weeks to 4 months.	RNs trained patients to use the following devices: (1) system digital scale/sphygmomanometer (34 patients); (2) 1-lead ECG (8 patients); (3) system intraocular pressure/sphygmomanometer/blood glucose meter (4 patients); (4) 12-lead ECG (2 patients).	After the training most patients were able to use the device. In 2 cases the wife of the patient provided support; in 4 cases homecare nurses carried out the measurements. Data were encrypted and transferred over a safe connection via the Internet to the project server at the data service center daily.	The data service center reviewed data for verification and analysis. Data transfer to the clinician was tailored to each physician's individual preferences and included PDF files and manual entries in the patient files. The clinician received a message from the data service center only when measurements deviated from the predefined ranges.	A standardized questionnaire elicited the perceptions of two clinicians and three RNs about the usefulness of RMT in primary care practices and the impact of delegating clinician home visits to qualified RNs.

AGNES, German abbreviation for general practitioner (GP)-supporting, community-based, e-health-assisted, systematic intervention; APTCare, Anticipatory and Preventive Team Care; BMI, body mass index; BP, blood pressure; CAD, coronary artery disease; CAPD, continuous ambulatory peritoneal dialysis; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; DM, diabetes mellitus; ECG, electrocardiograph; EHR, electronic health record; FDA, Food and Drug Administration; FEV1, forced expiratory volume in the first second; HTN, hypertension; IT, information technology; LCC, lead care coordinator; NOS, not otherwise specified; NP, nurse practitioner; NR, not reported; PT, physical therapy; RMT, remote monitoring technology; SpO<sub>2</sub>, oxygen saturation; SUH, Stepping Up to Health; VA, Veterans Administration; VHA, Veterans Health Administration.