Remote monitoring

▶ Intervention in brief

High risk:	**Remote monitoring** is the use of technology to enable providers to monitor patient clinical indicators outside of care settings. The goal is to help patients maintain their independence, improve clinical outcomes, and reduce cost.
Strength of evidence — Medium	Findings are inconsistent across meta-analyses and randomized controlled trials.
Impact	• **Decreased cost:** 30% decrease in total cost of care • **Decreased utilization (wide range):** 0-40% decrease in admissions; 0-62% decrease in length of stay; 35% decrease in ED use • **Improved quality, clinical outcomes:** 0-67% decrease in mortality; 21 point difference on the Minnesota Living With Heart Failure Questionnaire; insignificant change in BMI, weight, waist circumference, body fat percentage, and systolic and diastolic blood pressure • **Increased access:** Not demonstrated • **Improved stakeholder satisfaction:** Not demonstrated
How to succeed	To build an effective remote monitoring program: • Create exclusion criteria for remote patient monitoring to ensure staff target the most complex patients with disease states most likely to benefit from remote monitoring • Balance volume of biometrics monitored with patient ease of use • Weigh trade-offs of creating a separate remote patient monitoring data analyst role • Establish remote patient monitoring data-sharing practices with patients' physicians To learn more about remote monitoring programs, check out our Remote Monitoring Programs for Heart Failure Patients brief here.

▶ Demonstrated impact

Literature review summary

Title: Impact of Remote Patient Monitoring on Clinical Outcomes: An Updated Meta-analysis of Randomized Controlled Trials
Publication: Nature Partner Journals
Date: 2018
Type: Meta-analysis
Study population: Adults at risk of or currently have weight-related issues across 27 studies and 13 countries
Major findings: Remote patient monitoring resulted in insignificant change in BMI, weight, waist circumference, body fat percentage, systolic blood pressure, and diastolic blood pressure. Interventions based on health behavior models and personalized coaching were more likely to be successful.
Source: Full article here.

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Title: Advancing Your Approach to Ambulatory Care Management
Publication: Advisory Board
Date: 2017
Type: Case study
Study population: Patients under the Banner iCare virtual intensive ambulatory care program include the 5% costliest patients enrolled in one of Banner Health's health plans.
Major findings: The virtual support program, which includes in-person health coach interactions, resulted in reduced overall cost of care (30%).
Source: Full article here.

Title: Remote Monitoring Reduces Healthcare Use and Improves Quality of Care in Heart Failure Patients with Implantable Defibrillators
Publication: Circulation
Date: 2012
Type: Randomized controlled trial
Study population: 200 patients from six centers assigned to either remote monitoring or standard patient management. On average, participants were male (79%), 66-68 years old, with an underlying heart disease.
Major findings:
• Decreased ED utilization: 35%
• Decreased total utilization: 21%
• Improved quality of life: 21 point difference using the Minnesota Living With Heart Failure Questionnaire after 16 months
Source: Full article here.

Title: Evaluating the Evidence Base for the Use of Home Telehealth Remote Monitoring in Elderly with Heart Failure
Publication: Telemedicine and e-Health
Date: 2009
Type: Meta-analysis
Study population: Patients across the nine selected randomized controlled trials were an average age of 53-67 years old and had CHF.
Major findings:
• Reduced overall admissions in six of the nine studies: 27-40%
• Reduced length of stays in two of the nine studies: 53-62%
• Reduced mortality in three of the nine studies: 30-67%
Source: Full article here.

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Appendix

- Noah B, et al., "Impact of remote patient monitoring on clinical outcomes: an updated meta-analysis of randomized controlled trials" *Nature Partner Journals*, (2018), https://www.nature.com/articles/s41746-017-0002-4 .

- "Advancing Your Approach to Ambulatory Care Management," Population Health Advisor, Advisory Board, https://www.advisory.com/research/population-health-advisor/white-papers/2017/advancing-your-approach-ambulatory-care-management?WT.ac=inline_PHA_resrep_x_x_x_CTC_2018Mar02_Eloqua-RMKTG+Blog.

- Dang S, "Evaluating the Evidence Base for the Use of Home Telehealth Remote Monitoring in Elderly with Heart Failure," *Telemedicine and e-Health*, 15, no. 8 (2009): 783-796, https://www.ncbi.nlm.nih.gov/pubmed/19831704

- Landolina M, "Remote Monitoring Reduces Healthcare Use and Improves Quality of Care in Heart Failure Patients With Implantable Defibrillators," *Circulation*, 125, no. 24 (2012): 2985-2992, https://www.ncbi.nlm.nih.gov/pubmed/22626743.

Source: Population Health Advisor research and analysis.

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