Evidence Supporting Clinical Effectiveness and Safety of Remote Patient Monitoring for Treating Hypertension & Type 2 Diabetes

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I. Executive Summary

Multiple randomized controlled trials, systematic reviews and meta-analyses, and observational studies demonstrate the clinical efficacy of remote patient monitoring (RPM) when it is performed alongside provider-led, team-based care, for patients with hypertension and type 2 diabetes. By combining consistent, real-time tracking of patients' BP and other vital signs outside of the clinical setting and support from a responsive provider, patients are able to receive the high-quality and easily accessible care CMS envisioned when creating these services and offering them to all Medicare beneficiaries. The published literature clearly demonstrates how RPM can enhance patient adherence, provide early detection of hypertensive or diabetic crises, and facilitate timely intervention by health care providers, which has led to its definitive adoption and recommendation by national societies and guidelines.

II. Evidence Supporting Clinical Effectiveness of RPM for Hypertension Management

A. Considerable peer-reviewed evidence establishes the clinical efficacy of RPM for treating hypertension.

1. Randomized Controlled Clinical Trials (RCTs)

The TOUCHED randomized clinical trial led by Prendergast (2025) demonstrates that RPM combined with multidisciplinary education significantly improves blood pressure outcomes in hypertensive patients.[1] Conducted at an urban academic emergency department with 574 adults, the study tested an Education and mHealth Empowerment intervention integrating a Bluetooth-enabled home BP monitor, daily app-based self-tracking, behavioral text messaging, and pharmacist-led medication management. At 6 months, participants in the intervention arm had a greater mean systolic blood pressure reduction of 4.9 mm Hg compared with usual care (−14.3 mm Hg vs. −9.4 mm Hg; p = .02), demonstrating meaningful clinical benefit. The effect was particularly pronounced among predominantly Black and Latino populations—groups disproportionately burdened by hypertension—showing the intervention's potential to reduce disparities. By combining technology-enabled self-monitoring with team-based clinical oversight, this trial underscores RPM as a scalable, evidence-based model for improving hypertension control and continuity of care beyond traditional office visits.

In a multi-center RCT led by Teng (2025) of 1,006 participants with hypertension, patients were randomly assigned to RPM, self-monitoring or usual care.[2] All participants had access to follow-up visits every 3 months in the 2-year study period. After 24 months, SBP and DBP were reduced by 57% and 11% more in the RPM group compared to the usual care group. In addition, the BP goal attainment rate was significantly higher at 24 months in the RPM group compared to the usual care group (absolute difference: 16.56%

[1] Prendergast H, Kitsiou S, Petzel Gimbar R, Freels S, Sanders A, Daviglus M, Kotini-Shah P, Carter B, Del Rios M, Heinert S, Khosla S. Emergency Department-Based Education and mHealth Empowerment Intervention for Hypertension: The TOUCHED Randomized Clinical Trial. JAMA Cardiol. 2025 Jul 1;10(7):657-665. doi: 10.1001/jamacardio.2025.0675.

[2] Teng TQ, Sun GX, Yu ZY, Liu ZS, Wang T, Wu Q, Qin RR, Wang MM, Chen R, Xu JC, Zhang N, Song BX, Liu X, Zhang YY, Yu HC. Efficiency of remote monitoring and guidance in blood pressure management: a randomized controlled trial : The role of remote monitoring in improving hypertension management. BMC Med. 2025 Aug 5;23(1):459. doi: 10.1186/s12916-025-04278-6.

increase; relative difference: 31% increase). In conclusion, RPM with regular clinical follow up resulted in greater BP reduction and higher attainment of target BP than usual care over a 24-month period.

In the ADAMPA RCT (2023), Martinez-Ibáñez et al. studied the impact of self-monitoring plus self-titration of antihypertensive medication versus usual care for reducing SBP at 12 months in 312 poorly controlled hypertension patients.[3] SBP and DBP were lower in the intervention group compared to usual care. In addition, the intervention led to more patients achieving blood pressure control at 12 months than in the control group (55.8% vs. 42.3%, difference 13.5%, p=0.017). The intervention did not lead to additional use of unnecessary health services or adverse events among enrolled patients.

Several studies led by Margolis (2013, 2018, 2020), culminating in a five-year follow-up study published in 2020, validate the efficacy of home blood pressure telemonitoring combined with pharmacist case management versus usual care. First in 2013, Margolis et al. conducted a cluster randomized clinical trial that evaluated 450 adults with uncontrolled hypertension across 16 primary care clinics, comparing home blood pressure telemonitoring combined with pharmacist case management versus usual care.[4] Over 12 months, patients in the telemonitoring group transmitted readings to pharmacists who adjusted medications accordingly. The intervention achieved markedly higher control rates—71.8% vs 45.2% at 6 months—and sustained reductions in systolic blood pressure (SBP) at 6, 12, and 18 months (mean differences of −10.7, −9.7, and −6.6 mm Hg, respectively, all P<.01). The benefit persisted six months post-intervention, demonstrating that remote monitoring with active pharmacist titration leads to significant and durable improvements in hypertension control compared with usual care

Margolis et al. (2018) published a 54-month follow-up of the original trial, examining the long-term durability of blood pressure improvements achieved through a 12-month telemonitoring and pharmacist management intervention.[5] Among 450 adults with uncontrolled hypertension, the initial reductions in SBP (−10.7 mm Hg at 6 months) persisted up to 24 months but gradually attenuated thereafter. At 54 months, SBP was 130.6 mm Hg vs 132.6 mm Hg in the intervention and usual care groups, respectively (difference −2.5 mm Hg; P=.18). Routine clinical data corroborated the sustained benefit for two years post-intervention. The findings underscored that while remote BP monitoring with pharmacist care achieves strong short- to mid-term control, ongoing engagement or reactivation of monitoring may be required for long-term maintenance.

Margolis et al. (2020) conducted follow-up at 5 years on economic and clinical outcomes among the 450 patients previously randomized to telemonitoring plus pharmacist management or usual care.[6] The intervention group experienced a 50% reduction in cardiovascular events (4.4% vs 8.6%; OR 0.49, 95% CI 0.21–1.13) and lower rates of stroke and myocardial infarction. Modeled costs showed total cardiovascular event expenses of $2,772 per patient in the intervention group vs $5,721 with usual care, yielding an estimated return on investment of 82–119% and a net savings of about $1,900 per patient. These findings

[3] Martínez-Ibáñez P, Marco-Moreno I, Peiró S, Martínez-Ibáñez L, Barreira-Franch I, Bellot-Pujalte L, Avelino-Hidalgo E, Escrig-Veses M, Bóveda-García M, Calleja-Del-Ser M, Ferrero-Gregori A, Iftimi AA, Hurtado I, García-Sempere A, Rodríguez-Bernal CL, Giménez-Loreiro M, Sanfélix-Gimeno G, Sanfélix-Genovés J; ADAMPA research group. Home Blood Pressure Self-monitoring plus Self-titration of Antihypertensive Medication for Poorly Controlled Hypertension in Primary Care: the ADAMPA Randomized Clinical Trial. J Gen Intern Med. 2023 Jan;38(1):81-89. doi: 10.1007/s11606-022-07791-z.

[4] Margolis et al. Effect of home blood pressure telemonitoring and pharmacist management on blood pressure control: a cluster randomized clinical trial. JAMA. 2013;310(1):46-56.

[5] Margolis et al. Long-term Outcomes of the Effects of Home Blood Pressure Telemonitoring and Pharmacist Management on Blood Pressure Among Adults With Uncontrolled Hypertension: Follow-up of a Cluster Randomized Clinical Trial. JAMA Netw Open. 2018;1(5):e181617.

[6] Margolis et al. Cardiovascular Events and Costs With Home Blood Pressure Telemonitoring and Pharmacist Management for Uncontrolled Hypertension. Hypertension. 2020;76(4):1097-1103.

demonstrate that remote blood pressure monitoring not only improves control but may also reduce long-term cardiovascular risk and healthcare costs.

McManus et al. (2024) completed the TASMIN-SR RCT, which sought to determine the effect of self-monitoring with self-titration of anti-hypertension medication compared to usual care on SBP among 552 patients with cardiovascular disease, diabetes or chronic kidney disease.[7] After 12 months, the mean BP was significantly lower in the intervention group (a difference of 9.2 mmHg (SBP) and 3.4 mmHg (DBP)) compared to the control group. The results were similar when evaluated across multiple subgroups without excessive adverse events.

2. Meta-Analyses and Systematic Reviews

Grover et al. (2025) evaluated 24 RCTs comparing telemonitoring, home blood pressure monitoring (HBPM) and usual care for reduction in BP and the post intervention BP in adults with hypertension.[8] They reported a significantly greater reduction in systolic blood pressure (SBP) (-3.7, $p<0.001$) and diastolic blood pressure (DBP) (-1.8, $p<0.001$) with telemonitoring when compared to usual care monitoring; HBPM also produced a greater lowering in SBP and DBP when compared to usual care, although less than telemonitoring (SBP -2.7, $p<0.001$; DBP -2.1, $p<0.001$). The authors concluded that telemonitoring yields a significantly greater reduction in SBP and DBP compared to usual care, with similar effectiveness to HBPM.

Acharya et al. (2024) performed a systematic review and meta-analysis of United States based telemedicine trials.[9] They included 31 trials to estimate the effect of telemedicine compared to usual care on reduction in systolic and diastolic blood pressure and rates of achieving blood pressure goal. They concluded that telemedicine resulted in a differential 7.3 mmHg reduction in systolic blood pressure, 2.7 mmHg reduction in diastolic blood pressure, and 10.1% increase in blood pressure control rate compared to usual care. In fact, greater blood pressure reduction was noted in trials where non physicians led pharmacotherapy and pharmacists provided support.

Fernando et al. (2022) conducted a systematic review and meta-analysis pooled data from 27 randomized controlled trials (n=9,100) evaluating remote interventions for concurrent management of hypertension, hyperglycemia, and dyslipidemia in people with diabetes.[10] Compared with usual care, remote management significantly improved all key cardiometabolic outcomes, including SBP (SMD −0.11, 95% CI −0.18 to −0.04; p=0.001) and DBP (SMD −0.09, 95% CI −0.16 to −0.02; p=0.02). Interventions typically combined education, telemonitoring, coaching, and medication management. These findings provide evidence that remote monitoring approaches effectively lower blood pressure.

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[7] McManus RJ, Mant J, Haque MS, Bray EP, Bryan S, Greenfield SM, Jones MI, Jowett S, Little P, Penaloza C, Schwartz C, Shackleford H, Shovelton C, Varghese J, Williams B, Hobbs FD, Gooding T, Morrey I, Fisher C, Buckley D. Effect of self-monitoring and medication self-titration on systolic blood pressure in hypertensive patients at high risk of cardiovascular disease: the TASMIN-SR randomized clinical trial. JAMA. 2014 Aug 27;312(8):799-808. doi: 10.1001/jama.2014.10057.

[8] Grover S, Mishra HP, Gupta R, Gupta LK. Effect of telemonitoring and home blood pressure monitoring on blood pressure reduction in hypertensive adults: a network meta-analysis. J Hypertens. 2025 Jul 1;43(7):1091-1098. doi: 10.1097/HJH.0000000000004008.

[9] Acharya S, et al., Self-Measured Blood Pressure-Guided Pharmacotherapy: A Systematic Review and Meta-Analysis of United States-Based Telemedicine Trials. Hypertension. 2024 Mar;81(3):648-657. doi: 10.1161/HYPERTENSIONAHA.123.22109. Epub 2024 Jan 8. PMID: 38189139.

[10] Fernando et al. Effectiveness of Remotely Delivered Interventions to Simultaneously Optimize Management of Hypertension, Hyperglycemia and Dyslipidemia in People With Diabetes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials [published correction appears in Front Endocrinol (Lausanne). 2022 May 09;13:916377].

Kalagara et al. (2022) performed a systematic review and meta-analysis of 18 randomized controlled trials that included RPM management programs and had BP data available for both the intervention and control groups.[11] The RPM intervention group had a greater mean weighted decrease in SBP (7.1) and DBP (5.1) compared to the control group (SBP: 3.1, DBP: 3.1). Effect sizes were also calculated and demonstrated greater SBP and DBP differences in 86% and 85%, respectively, of individuals in the RPM group when compared to the control group. As a result, the authors concluded that RPM represents a meaningful opportunity for hypertension management amid growing rates of uncontrolled hypertension across the United States.

Mills et al. (2018) carried out a meta-analysis of 100 randomized trials including 55,920 patients compared eight implementation strategies for hypertension control.[12] Among patient-level interventions, home blood pressure monitoring reduced SBP by 2.7 mm Hg (95% CI, 3.6–1.7 mm Hg; *P*<.001), while team-based care with medication titration by non-physicians (such as pharmacists or nurses) produced the greatest effect—SBP reduction of 7.1 mm Hg (95% CI, 8.9–5.2 mm Hg; *P*<.001). These data demonstrate that multilevel, technology-enabled, team-based approaches—especially those involving remote BP monitoring—are among the most effective strategies to improve blood pressure control across populations.

In a comparative effectiveness review, Uhlig et al. (2012) evaluated studies of self-measured blood pressure (SMBP) with or without additional support versus usual care.[13] Of the 49 total studies included, they concluded that the evidence to support self-measured blood pressure compared to usual care was moderate given lower BP with self-measured blood pressure compared to usual care (SBP/DBP -3.1/-2.0 mmHg) at 6 months. For SMBP plus additional support versus usual care, the strength of evidence is high and supports a lower BP at 12 months (SBP/DBP -3.4 to -8.9/-1.9 to -4.4 mmHg). Therefore, SMBP is effective for helping to control BP, with the greatest effect coming when combined with additional clinical resources.

A systematic review and meta-analysis by Agarwal et al. (2011) demonstrated that home BP has the greatest improvement when home BP monitoring is accompanied by specific programs to titrate anti-hypertensive drugs, including telemonitoring where BP readings obtained at home are relayed to the provider who can take appropriate clinical action.[14] Home blood pressure monitoring also resulted in less therapeutic inertia, which is defined as unchanged medication despite elevated BP, and ultimately greater reductions in SBP and DBP and therefore BP control.

3. Observational Data

In a cohort study, Feldman et al. (2025) reported on the impact of a comprehensive remote patient care program among 23,638 patients enrolled from across the United States, a majority of whom live in rural or

[11] Kalagara R, Chennareddy S, Scaggiante J, Matsoukas S, Bhimani A, Smith C, Putrino D, Dangayach NS, Mocco J, Schnipper JL, Auerbach AD, Kellner CP. Blood pressure management through application-based telehealth platforms: a systematic review and meta-analysis. J Hypertens. 2022 Jul 1;40(7):1249-1256. doi: 10.1097/HJH.0000000000003164.

[12] Mills et al. Comparative Effectiveness of Implementation Strategies for Blood Pressure Control in Hypertensive Patients: A Systematic Review and Meta-analysis. Ann Intern Med. 2018;168(2):110-120.

[13] Uhlig K, Balk EM, Patel K, Ip S, Kitsios GD, Obadan NO, Haynes SM, Stefan M, Rao M, Kong Win Chang L, Gaylor J, Iovin RC. Self-Measured Blood Pressure Monitoring: Comparative Effectiveness [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2012 Jan. Report No.: 12-EHC002-EF. PMID: 22439158.

[14] Agarwal R, Bills JE, Hecht TJ, Light RP. Role of home blood pressure monitoring in overcoming therapeutic inertia and improving hypertension control: a systematic review and meta-analysis. Hypertension. 2011 Jan;57(1):29-38. doi: 10.1161/HYPERTENSIONAHA.110.160911.

underserved areas.[15] The remote patient care program resulted in a statistically significant reduction in both SBP and DBP (-7/5mmHg, p<0.001). In addition, there was a 70% relative increase in the number of patients at goal BP after an average of 30 weeks of follow-up. Authors concluded that RPM coupled with an end-to-end clinical program can reduce BP and help more patients achieve BP goals across the United States regardless of geographic area.

In a pragmatic matched cohort study led by Persell (2024) using electronic health record data, the effect of RPM was studied in individuals prescribed RPM compared to matched controls from six primary care practices over a 18 month follow-up period.[16] Patients prescribed RPM had greater BP control (RPM: 71.5%, control cohort: 51.9%; p<0.001) and lower SBP based on both office and home measurements (131.6 vs. 136.0 mmHg, p=0.004). BP control was also higher at 18 months when assessed by office measurement only (RPM: 62.2%, control cohort: 51.9%, p=0.004).

In a prospective cohort study, Petito et al. (2023) evaluated the effect of RPM compared to temporally matched controls from 6 primary care practices in a 1:4 ratio (288:1152 patients). The primary outcome included blood pressure control (<140/90mmHG) at 3, 6, 9, and 12 months. RPM resulted in a greater percentage of patients achieving blood pressure goal at all time points in addition to lower systolic blood pressure. In addition to improved clinical outcomes, those individuals randomized to the RPM intervention group strongly adopted the technology and engaged more regularly with their primary care providers. Specifically, over 83% of individuals transmitted a blood pressure soon after enrollment and continued most days each month for an entire year. There was a statistically significant increase in the number of in-person, telehealth and patient portal encounters for the individual's prescribed RPM compared to match controls. This trial not only highlights the clinical benefit of RPM but also the opportunity for increasing engagement with healthcare providers.

In an observational study, Tang et al. (2023) attempted to estimate RPM's effect on hypertension care and spending. Using a matched observation study emulating a longitudinal, cluster randomized trial, the investigators concluded that patients in "high remote physiologic monitoring practices" had improved hypertension care outcomes but increased spending compared to patients from a low RPM practice. Of note, this analysis lacked blood pressure data and therefore assessed clinical effectiveness based on hypertension medication, outpatient visit, and hypertension-related acute care use. Most importantly, in subgroup analysis, they reported an even larger reduction in hypertension related emergency department visits and hospitalizations in the most susceptible patients, specifically those patients with low adherence to their hypertension medications at baseline. This was driven primarily by reduction in stroke and cardiovascular disease events. As for cost data, the majority of the reported increase in spending was related to RPM, which was the primary driver for the improved clinical outcomes. However, if RPM was at no cost to a patient, they would have reported a $72 reduction in hypertension related healthcare costs.

Blood et al. (2022) conducted a large-scale cohort study (Mass General Brigham, 2018–2021) that evaluated a remotely delivered hypertension and lipid management program involving 10,803 patients—including 3,658 with hypertension—supported by navigators, pharmacists, and standardized clinical algorithms.[17] Participants received home BP devices (Bluetooth or cellular-enabled), and medication

[15] Feldman DI, Reynolds S, Valor L, Babikian S, Feldman T, Curnow R, Stein BD, Frost C, Viswanathan S, Galles J, Simon LT, Cunningham E, Fudim M. Clinical and Engagement Results of a Nationwide Comprehensive Remote Patient Care Hypertension Program. JACC Adv. 2025 Jul;4(7):101892. doi: 10.1016/j.jacadv.2025.101892.

[16] Persell SD, Anthony L, Peprah YA, Lee JY, Li J, Sato H, Petito LC. Blood pressure outcomes at 18 months in primary care patients prescribed remote physiological monitoring for hypertension: a prospective cohort study. J Hum Hypertens. 2024 Mar;38(3):286-288. doi: 10.1038/s41371-024-00904-7.

[17] Blood et al. Results of a Remotely Delivered Hypertension and Lipid Program in More Than 10 000 Patients Across a Diverse Health Care Network [published correction appears in JAMA Cardiol. 2022 Nov 30]. JAMA Cardiol. 2023;8(1):12-21.

titration guided remotely. At 6 and 12 months, those in the active medication management group had mean systolic/diastolic BP reductions of 8.7/3.8 mm Hg and 9.7/5.2 mm Hg, respectively, compared with negligible changes in the education-only control cohort (P<.001). Similar improvements were observed across racial, ethnic, and language groups, demonstrating equitable outcomes and scalability of the model. The study concludes that a remote program that relied on connected blood pressure cuffs for automatic transmission of data – i.e., RPM – alongside a navigator-led, pharmacist-supported care model is associated with significant reductions in blood pressure.

B. National guidelines support the use of home-based blood pressure monitoring as a critical part of RPM programs to manage hypertension effectively.

In 2017, the AHA/ACC/Multi-Society hypertension guidelines provided the highest strength of recommendation (Class 1) based on the highest quality of data (Level A) to support out of office BP measurements to confirm the diagnosis of hypertension and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions. A similarly strong recommendation (Class I) based on the highest quality data (Level A) was also given to systematic strategies to help improve BP control, including use of home blood pressure monitoring, team-based care, and telehealth strategies. A moderately strong recommendation (Class 2a) based on the highest quality of data (Level A) was given to telehealth strategies to help improve hypertension control.

In 2020, the American Heart Association and American Medical Association published a joint policy statement highlighting the role of self-measured blood pressure as a way to provide health and economic benefits for patients with hypertension.[18] They advocated for the investment in creating and supporting the infrastructure for expanding self-measured BP monitoring, including through the use of RPM.

The 2025 AHA/ACC/Multi-Society hypertension guidelines – like the 2017 guidelines – provide the strongest recommendations (Class 1) based on the highest quality of data (Level A) to support home blood pressure monitoring in patients either suspected of having hypertension to confirm the diagnosis or those currently taking antihypertensive medications to help with monitoring the titration of BP-lowering medications in combination with cointerventions such as patient education, telehealth counseling, and clinical interventions.

The recent guidelines emphasize a framework in clinical practice to improve hypertension control. For adults with uncontrolled hypertension, this includes an integrated treatment model that incorporates accurate BP measurement, prompt treatment, patient engagement, and ongoing review of home blood pressure monitoring as a way to help improve BP control (Class I, Level B). The guidelines also encourage the use of health information technology for BP care, including the use of synchronous or asynchronous communication with patients, given its role in helping to improve BP control via titration of BP medications, increasing access to care, and ensuring appropriate adherence to prescribed care (Level 1, Class B). Lastly, the guidelines recommend telehealth interventions in adults with uncontrolled hypertension given its effectiveness in reducing BP and improving office BP control (Level 1, Class B)

[18] Shimbo D, Artinian NT, Basile JN, Krakoff LR, Margolis KL, Rakotz MK, Wozniak G; American Heart Association and the American Medical Association. Self-Measured Blood Pressure Monitoring at Home: A Joint Policy Statement From the American Heart Association and American Medical Association. Circulation. 2020 Jul 28;142(4):e42-e63. doi: 10.1161/CIR.0000000000000803. Epub 2020 Jun 22. Erratum in: Circulation. 2020 Jul 28;142(4):e64. doi: 10.1161/CIR.0000000000000906.

C. The studies UHC used to evaluate the role of RPM in hypertension care have significant limitations.

Mehta et al. (2024) - This RCT includes only 246 patients from one urban primary care clinic at a leading academic medical center. This is critically important as the usual care in this population significantly differs from that of many uncontrolled hypertension patients across the country. That said, despite not achieving statistical significance, which can be meaningfully impacted by a low sample size, there was still a clinically meaningful reduction in BP (-5.3/2.0 mmHg) and a greater percentage of patients achieving BP goal (49% vs. 40%) in the RPM compared to usual care group. The authors acknowledge the critical limitation of insufficient power to detect improvements in BP control in their manuscript and even state "we cannot make conclusions about the effectiveness or lack of effectiveness of remote monitoring."

Choi et al. (2020) - This systematic review and meta-analysis, which was published in a low-quality journal (Impact Factor 2.0), is not publicly available for review outside of the abstract. In the abstract, the authors do however conclude that RPM resulted in a greater reduction of SBP and DBP and greater increase in achievement of BP control. Despite this, they conclude that RPM is not superior to usual care in contrast to the improved outcomes they report with the intervention.

In addition, in the following year (2021), the first author (Woo Seok Choi) of the previously cited manuscript was the senior author of a systematic review and meta-analysis titled: "An updated meta-analysis of remote blood pressure monitoring in urban-dwelling patients with hypertension."[19] In this manuscript, they demonstrated that RPM leads to a greater reduction in SBP and DBP as well as greater increase in BP control when compared to usual care. This time, they concluded that RPM "is effective in reducing BP and in achieving target BP levels for urban-dwelling patients with hypertension."

McManus et al. (2018) - This RCT demonstrates the positive effects of both self-monitoring and telemonitoring on BP reduction and control when compared to usual care. The study authors conclude that these interventions lead to significantly lower BP and "could be the cornerstone of hypertension management in primary care." Yet, this was included as a study that did not provide sufficient evidence to establish the safety and efficacy of RPM for treating hypertension.

AHA/ACC Guidelines - We have provided an in-depth summary of the 2025 Hypertension guidelines above, which clearly support the use of home blood pressure monitoring coupled with remote patient care as means to improve the team-based care of patients with hypertension. There is no mention of "insufficient evidence to recommend the use of technology-enable remote monitoring in managing hypertension", but instead a clear recommendation for the use of health information technology (detailed above) as a means to improve hypertension team-based care.

VA/DOD 2020 Guidelines - UHC states that this document concludes there is a weak recommendation for the use of technology-based interventions that include telemonitoring and/or mobile applications. However, this framing does not make explicit that VA/DOD defines a recommendation of "[w]eak for" as "[w]e suggest" using this intervention for patients. Further, the guidelines clearly state: "[W]e recommend offering pharmacist-led medication management as an option for patients with hypertension." The guideline notes that this recommendation is based on two systematic reviews where care was provided by pharmacists "either in person, remotely, or a combination of the two." Such "interventions are not required to be face-to-face to show benefit" based on a manuscript by Santschi et al. (2014), which included a positive trial of home blood pressure telemonitoring and pharmacist management intervention for BP control.

[19] Park SH, Shin JH, Park J, Choi WS. An Updated Meta-Analysis of Remote Blood Pressure Monitoring in Urban-Dwelling Patients with Hypertension. Int J Environ Res Public Health. 2021 Oct 9;18(20):10583. doi: 10.3390/ijerph182010583.

III. Evidence Supporting Clinical Effectiveness of RPM for Type 2 Diabetes Management

A. Considerable peer-reviewed evidence establishes the safety and efficacy of RPM for treating type 2 diabetes.

1. Randomized Controlled Clinical Trials

Yin et al. (2022) conducted a randomized study of overweight and obese adults with type 2 diabetes (n=120) compared structured telemedicine-guided management with routine clinic-based care during the COVID-19 pandemic.[20] Over a six-month period, participants receiving remote monitoring and virtual follow-up achieved a greater HbA1c reduction (−0.6%) versus a modest rise (+0.4%) in the control group, with a higher proportion meeting target glycemia. The trial demonstrated that even under pandemic restrictions, telemedicine maintained effective glucose control and patient engagement.

Yang et al. (2020) evaluated the clinical efficacy and applicability of a mobile phone-based glucose-monitoring and feedback system for the management of type 2 diabetes in multiple primary care settings.[21] Investigators randomized in 2:1 fashion 247 participants to the intervention and control groups. All patients participated in face-to-face physician consultations each month for the management of diabetes in the clinic while the intervention group also uploaded their daily self-monitoring blood glucose results to the mobile app. These results were viewed by physicians who later provided short feedback messages to patients at least once per week. At 3 months, the intervention group had a significantly greater drop in HbA1c (-0.3%, p=0.003) and fasting plasma glucose (-17.29mg/dL, p=0.005) compared to the control group. This study further demonstrates the additive clinical benefit of at home monitoring where clinician feedback can be incorporated for further chronic disease management.

Bollyky et al. (2018) provided glucose meters and access to certified diabetes educators to study the incremental effects of adding lifestyle coaching on blood glucose, HbA1c, and weight.[22] Investigators randomized 330 participants with type 2 diabetes, HbA1c ≥7.5 and BMI ≥25 to either a connected scale, scale plus lightweight coaching, scale plus intense coaching and no further intervention for 12 weeks. Weight loss and blood glucose decreases were higher in the intensive compared with the lightweight coaching and scale-only groups (weight change -6.4, -4.1, -1.1 lbs, p=0.01; blood glucose change -19.4, -11.3, -2.9 mg/dL, p=0.02). The authors concluded a program inclusive of blood glucose monitoring and intensive lifestyle coaching significantly improves blood glucose control in individuals with diabetes.

Di Molfetta et al. (2018) conducted a multi-center randomized controlled trial (n=123) where adults with insulin-treated diabetes received real-time blood glucose transmission via smartphone-connected meters with ongoing physician oversight versus standard in-person management.[23] After six months, the intervention group achieved a mean HbA1c reduction of −0.38% compared with minimal change in

[20] Yin et al. Telemedicine management of type 2 diabetes mellitus in obese and overweight young and middle-aged patients during COVID-19 outbreak: A single-center, prospective, randomized control study. PLoS One. 2022;17(9):e0275251.

[21] Yang Y, Lee EY, Kim HS, Lee SH, Yoon KH, Cho JH. Effect of a Mobile Phone-Based Glucose-Monitoring and Feedback System for Type 2 Diabetes Management in Multiple Primary Care Clinic Settings: Cluster Randomized Controlled Trial. JMIR Mhealth Uhealth. 2020 Feb 26;8(2):e16266. doi: 10.2196/16266.

[22] Bollyky JB, Bravata D, Yang J, Williamson M, Schneider J. Remote Lifestyle Coaching Plus a Connected Glucose Meter with Certified Diabetes Educator Support Improves Glucose and Weight Loss for People with Type 2 Diabetes. J Diabetes Res. 2018 May 16;2018:3961730. doi: 10.1155/2018/3961730.

[23] Di Molfetta et al. A telemedicine-based approach with real-time transmission of blood glucose data improves metabolic control in insulin-treated diabetes: the DIAMONDS randomized clinical trial. J Endocrinol Invest. 2022;45(9):1663-1671.

controls, and more patients met glycemic targets (<7%). These findings confirm that integrating remote glucose data streams into clinical workflows leads to measurable metabolic improvement and higher treatment adherence among insulin-treated patients.

2. Meta-Analyses and Systematic Reviews

Fernando et al. (2022) conducted a systematic review and meta-analysis pooled data from 27 randomized controlled trials (n=9,100) evaluating remote interventions for concurrent management of hypertension, hyperglycemia, and dyslipidemia in people with diabetes.[24] Across studies, remote management significantly reduced HbA1c by a pooled standardized mean difference (SMD) of −0.25 (95% CI −0.33 to −0.17; p<0.001), reflecting an average improvement of roughly 0.5–0.7 percentage points compared with usual care. These effects were most pronounced in trials incorporating active remote monitoring, tele-coaching, and clinician-led pharmacologic adjustments. The findings confirm that integrated telehealth programs can produce clinically meaningful and multifactorial improvements in glycemic control, underscoring their role as effective digital extensions of traditional diabetes care.

Lee et al. (2018) synthesized findings from 29 RCTs evaluating telehealth and remote glucose monitoring interventions for adults with type 2 diabetes.[25] Across studies, telemedicine reduced HbA1c by an average of 0.55 percentage points (95% CI −0.73 to −0.36; p < 0.001) compared with standard clinic-based care. Subgroup analyses showed the greatest improvements (0.5–0.8%) when remote data were used for active medication titration and two-way clinician feedback rather than passive education or data logging alone. Trials incorporating frequent contact (≥1 interaction per week) and real-time glucose data uploads achieved the strongest glycemic effects and better adherence. Beyond glycemic benefit, several studies noted improved self-management behaviors, treatment satisfaction, and modest improvements in blood pressure and weight. Collectively, these results demonstrate that telehealth-enabled remote monitoring meaningfully improves glycemic control, especially when embedded within coordinated clinical workflows involving ongoing provider review and feedback.

Shen et al. (2018) completed a meta-analysis of 35 RCTs to evaluate the effect of internet-based interventions on patients with type 2 diabetes.[26] The weighted mean difference of HbA1c between the internet-based interventions and control groups was 0.43%, favoring the internet-based interventions. Authors emphasize the clinical benefit of this difference by highlighting the 21% reduction of risk for any endpoint related to diabetes, including death, myocardial infarction and microvascular complications with a 1% decrease in HbA1c, suggesting the importance of optimizing internet-based interventions in the management of type 2 diabetes.

Su et al. (2016) performed a meta-analysis of aggregated results from 55 RCTs (n=9,258) evaluating telemedicine interventions for diabetes management, including structured teleconsultations, remote glucose monitoring, and mobile or web-based platforms.[27] Across all studies, telemedicine was associated with a

[24] Fernando et al. Effectiveness of Remotely Delivered Interventions to Simultaneously Optimize Management of Hypertension, Hyperglycemia and Dyslipidemia in People With Diabetes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials [published correction appears in Front Endocrinol (Lausanne). 2022 May 09;13:916377].

[25] Lee et al. The impact of telehealth remote patient monitoring on glycemic control in type 2 diabetes: a systematic review and meta-analysis of systematic reviews of randomised controlled trials. BMC Health Serv Res. 2018;18(1):495. Published 2018 Jun 26.

[26] Shen Y, Wang F, Zhang X, Zhu X, Sun Q, Fisher E, Sun X. Effectiveness of Internet-Based Interventions on Glycemic Control in Patients With Type 2 Diabetes: Meta-Analysis of Randomized Controlled Trials. J Med Internet Res. 2018 May 7;20(5):e172. doi: 10.2196/jmir.9133.

[27] Su et al. Does telemedicine improve treatment outcomes for diabetes? A meta-analysis of results from 55 randomized controlled trials. Diabetes Res Clin Pract. 2016;116:136-148.

pooled standardized mean HbA1c difference of −0.48 (95% CI −0.49 to −0.25; $p < 0.001$) compared with usual care. The effect was most pronounced in type 2 diabetes (−0.63%) and among programs that featured real-time data transmission with active clinician feedback or medication adjustment, rather than educational messaging alone. Interventions delivered by multidisciplinary teams (physicians, nurses, pharmacists, and dietitians) and those exceeding six months' duration produced the largest and most durable glycemic improvements. Secondary outcomes from several included trials demonstrated modest benefits in lipid profiles, body weight, and blood pressure, indicating a broader metabolic impact of ongoing remote engagement. Overall, this meta-analysis provides strong evidence that telemedicine—particularly models combining remote physiologic monitoring with proactive clinical management—significantly enhances glycemic control in adults with type 2 diabetes.

Zhai et al. (2014) performed a meta-analysis that synthesized findings from 35 RCTs evaluating telemedicine for type 2 diabetes management.[28] Across studies, telehealth interventions incorporating remote glucose monitoring, data transmission, and clinician feedback significantly reduced HbA1c compared with usual care, with a pooled mean difference of approximately −0.37%. Cost analyses also indicated potential savings when remote monitoring was integrated into coordinated clinical management. These results provide early large-scale evidence that remote monitoring effectively augments conventional diabetes care by improving glycemic control and optimizing resource use.

B. National guidelines support the use of RPM to manage type 2 diabetes effectively.

The 2025 American Diabetes Association Standards of Care Guidelines emphasize the use of Diabetes Technology and explicitly recommend providing blood glucose monitoring devices for people with diabetes. The guidelines also encourage combining technology (i.e., blood glucose monitors) with online or virtual coaching to improve glycemic outcomes in individuals with diabetes or prediabetes.[29] They state that when prescribing a device, patients with diabetes and their caregivers should receive initial and ongoing education and training, either in person or remotely, and there should be ongoing evaluation of technique, results, and the ability to utilize data, including uploading or sharing data (if applicable), to monitor and adjust therapy. In other words, clinical guidelines governing diabetes management codify RPM alongside clinic visits as best-practice diabetes care.

C. The studies UHC used to evaluate the role of RPM in treating diabetes have significant limitations.

Amante et al. (2021) - This small, randomized crossover study attempts to demonstrate the effect of an intervention that utilized a cellular-connected glucose meter and phone-based diabetes coaching. Both groups exposed to the intervention saw a meaningful reduction in HbA1c, with a significantly greater drop when going from usual care to the intervention group and a non-significant increase when going from the intervention group to usual care. Although the authors report that there was no significant treatment effect when comparing the intervention and control groups, the p-value was borderline significant in a study that is underpowered to show small differences between groups.

Lee et al. (2020) - In a pragmatic 52-week cluster-randomized controlled study, Lee et al. randomized 240 patients in Malaysia with uncontrolled type 2 diabetes to the intervention group, which received home gluco-telemonitors that transmitted data to a care team who could adjust medications accordingly, help improve adherence and encourage healthier lifestyle or use of resources to reduce risk factors, or usual care.

[28] Zhai et al. Clinical- and cost-effectiveness of telemedicine in type 2 diabetes mellitus: a systematic review and meta-analysis. Medicine (Baltimore). 2014;93(28):e312.
[29] ADA Standards of Care in Diabetes – 2025, Diabetes Technology, https://diabetesjournals.org/care/issue/48/Supplement_1.

Decreases in HbA1c were greater for the intervention group, albeit small, however the small sample size and the unique geographic area of the population and clinicians make this study difficult to generalize to the general population of patients with diabetes who would benefit from improved blood glucose control.

Bollyky et al. (2018) - As noted above, the authors concluded a program inclusive of blood glucose monitoring and intensive lifestyle coaching significantly improves blood glucose control in individuals with diabetes.

VA/DOD 2023 Guidelines – UHC states that this document concludes there is a weak recommendation for the use of telehealth interventions to improve outcomes in adults with type 2 diabetes mellitus. However, this framing does not make explicit that VA/DOD defines a recommendation of "[w]eak for" as "[w]e suggest" using this intervention for patients. The guidelines actually recommend the use of telehealth interventions to improve outcomes in adults with type 2 diabetes mellitus. This is in line with more recent national guidelines from the ADA, cited above, which codify RPM alongside clinic visits as best-practice diabetes care.