# Remote Patient Monitoring in Rural Populations

Telehealth Everywhere
April 2026

National Telehealth Center of Excellence

The University of Mississippi Medical Center
Center for Telehealth

# Disclosures

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# Objectives

- Compare the structure and reimbursement mechanisms of RPM, CCM, and APCM.
- Analyze how telehealth integration changes clinical decision-making and care coordination.
- Recognize common implementation barriers and practical solutions.
- Develop an initial framework for integrating telehealth into chronic disease workflows.

# Chronic Disease Management Telehealth Models

# Why Telehealth Matters

- Chronic disease drives healthcare cost and mortality
- Rural access barriers
- Workforce shortages
- Transportation gaps
- Fragmented chronic care

# History of UMMC Remote Patient Monitoring

**Original Research**

## Mississippi Diabetes Telehealth Network: A Collaborative Approach to Chronic Care Management

- UMMC and North Sunflower Medical Center
- 171 patients with diabetes, A1c >7%
- RPM with glucose monitoring and education
- A1c 9.5% to 7.9% over 12 months

Davis TC, et al. Telemed J E Health. 2020

# Chronic Disease Management – Telehealth Models

## Remote Patient Monitoring (RPM)

- Physiologic monitoring using connected devices
- Device requirement
- Staffing model:
  - Supervising provider
  - RN monitoring team
  - LPN/MA
  - RPM coordinator and device support
  - Billing/compliance specialist

## Chronic Care Management (CCM)

- Structured non-face-to-face care coordination for Medicare patients
- Requires two or more chronic conditions
- No device requirement
- Staffing model:
  - Supervising provider
  - RN care manager
  - LPN/care coordinator support
  - Billing support

## Advanced Primary Care Management (APCM)

- CMS model supporting comprehensive population-level primary care management
- Optional device requirement
- Staffing model:
  - Primary care physician or NP
  - RN care manager
  - Behavioral health integration
  - Population health/data analyst
  - Digital health coordinator

# Patient Scenario

# Meet Mr. Carter

- Age: 72 years old
- Past medical history
  - Uncontrolled hypertension
  - Type 2 diabetes
  - Stage 2 CKD
- Lives in rural Mississippi, about 45 minutes from clinic
- He has a fixed income
- He occasionally misses doses of his medications

# No Telehealth Model

# Scenario: Traditional Care

- Mr. Carter has been monitoring his blood pressure at home with a cuff he bought at the pharmacy
- He is currently taking lisinopril 40 mg and amlodipine 5 mg for hypertension
- 7:12 AM – BP: 180/104 mmHg
- Patient notes that the last 3 days of his home readings have been elevated
  - 158/88 mmHg, 164/90 mmHg, 171/92 mmHg
- He has a mild headache
- He decides to call the clinic

# Traditional Workflow

- Mr. Carter leaves a voicemail for the clinic
- Nurse calls back
- Symptom triage
- Provider message
- Medication adjusted
- No structured follow-up
- No reimbursement

# Limitations

- Reactive care
- No longitudinal trend data
- No systematic adherence review
- No documentation of time
- No financial sustainability
- No proactive outreach

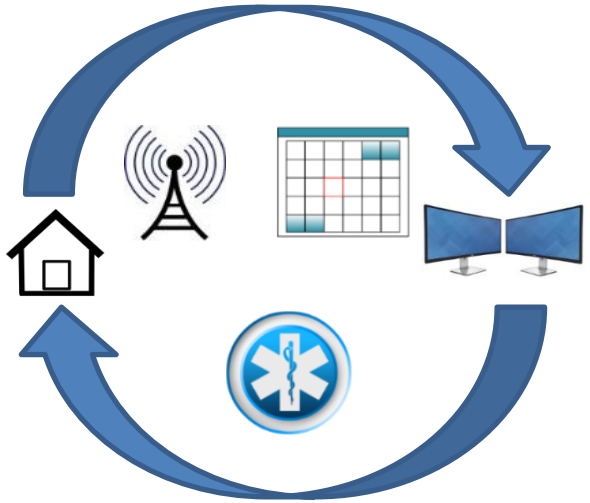
# Add RPM

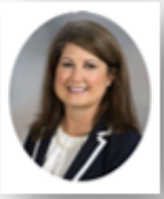
# Same Patient. Now Enrolled in RPM.

- Daily, time-stamped BP transmission
- Dashboard alerts
- 16+ days of data
- Structured escalation and safety protocols

# RPM Workflow

- Telemonitoring kit
- Linked with Epic EHR
- Full tech support





- Health education
- RN daily monitoring
- Safety alerts & protocols
- Patient engagement

- Routine team meetings
- Monthly/biweekly data reviews
- PharmD med titration and med reconciliation
- Algorithms developed by physicians

# Initial Intake Process

**RPM Medication Review**

RPM Enrollment Date: 6/15/2022
Enrolled for: Hypertension

**ALLERGIES:**
No known medication allergies

**MEDICATIONS:**

Encounter Medications

**HYPERTENSION MEDICATIONS:**

| Medication | Dosage | Directions | Last Fill Date | Quantity |
|---|---|---|---|---|
| Losartan | 100 mg | Once daily | 5/20/2022 | 90 |
| Amlodipine | 10 mg | Once daily | 6/15/2022 | 30 |
| | | | | |
| | | | | |

**Address barriers to adherence**

- **Transportation**
- **Side effects**
- **Forgetfulness**
- **Cost**

**MEDICATION ADHERENCE:**
What problems does the patient have with their medication? None reported
How many missed doses? 0
Appropriate refill history at the pharmacy? Yes
Adherence tools that patient uses? Pill box
Statin: Yes – Atorvastatin 40 mg daily

**PREFERRED PHARMACY**

KROGER DELTA 474 - CLINTON, MS - 107 HWY 80 EAST
107 HWY 80 EAST
CLINTON MS 39056
Phone: 601-925-6343 Fax: 601-925-6344

**PHARMACY INSURANCE**
Name: Medicare/Medicaid/Private

# Initial Intake Process

**LIFESTYLE FACTORS:**
Meals/snacks: Patient reports that her diet includes fruits, vegetables, and nuts. She typically eats chicken, fish, and shrimp, but she does occasionally eat pork chops and bacon. She denies eating canned or processed meats. She uses Mrs. Dash seasoning when cooking and denies adding extra salt to her foods.

Physical Activity: Active (3-4 exercise activities per week). Patient reports walking for 30 minutes 3 to 4 times a week with her neighbor.

**LABS:**

**Lab Results**

| Component | Value |
|---|---|
| NA | 140 |
| K | 4.0 |
| BUN | 16.0 |
| CREATININE | 0.86 |
| CHOL | 208 |
| TRIG | 299 |
| HDL | 50 |
| LDLCALC | 98 |

Estimated GFR: >60 ml/min/1.73m2
ASCVD Risk: Estimated 10-year risk of ASCVD is 41.8% based on gender, race, most recent cholesterol, HDL, systolic blood pressure, and smoking status

**PLAN:**
Patient will participate in the remote patient monitoring medication management program for hypertension and has been informed of pharmacist collaborative agreement with Dr. Clark.

1. The patient will obtain daily blood pressure measurements. RPM Team will review measurements monthly and adjust medications per protocol, aiming to **achieve average BP <130/80** based on provider recommendation.

2. The medication record in Mr. Patient's profile has been updated and adjusted to reflect which medications the patient reports he is taking and how he is taking his medications as of today.

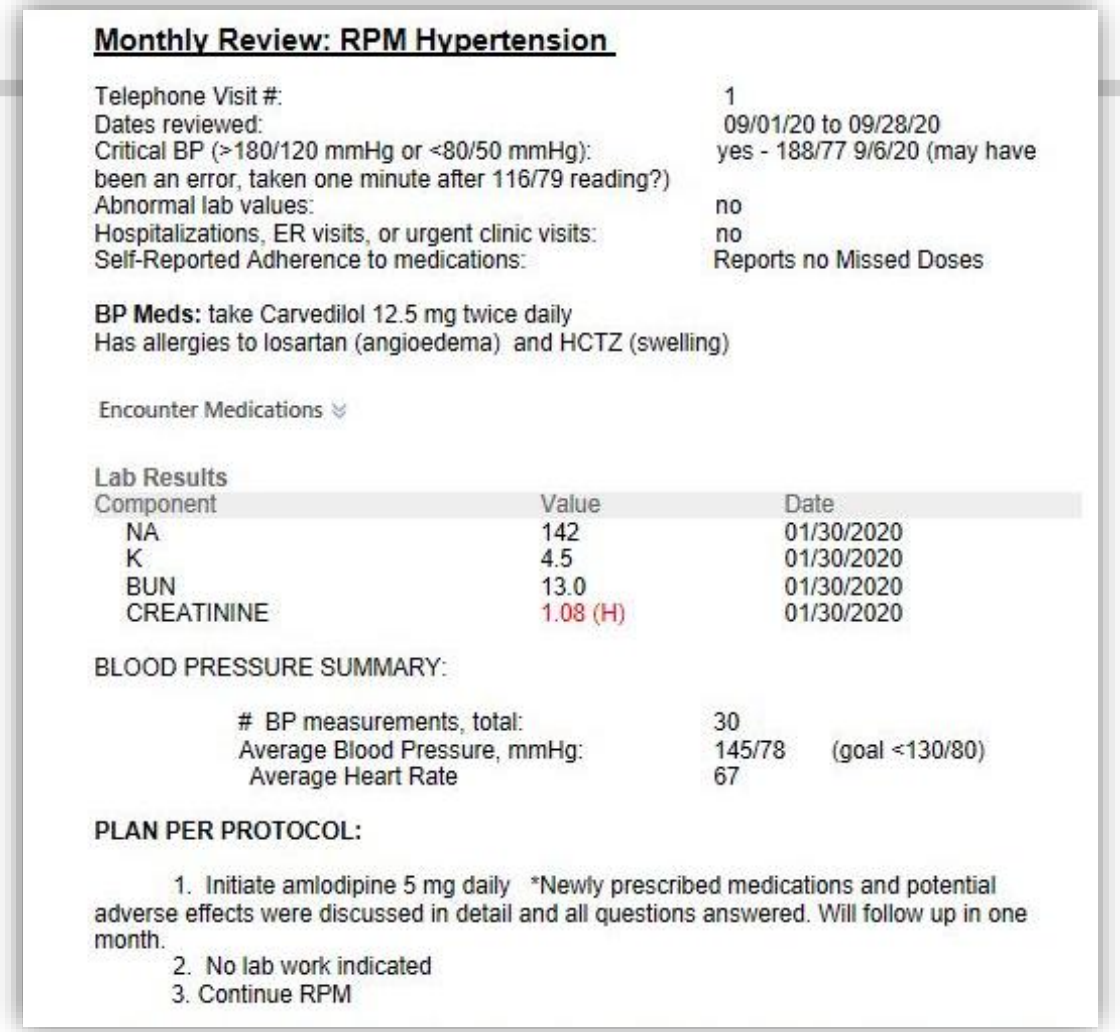
3. Education provided including the importance of a heart healthy diet, regular exercise, program participation and medication adherence to prevent complications of hypertension.

# RPM Reviews

Goals:

Hypertension
Average BP <130/80 mmHg or <140/90 mmHg

Type 2 Diabetes Mellitus
Average pre-prandial blood glucose of <140 mg/dL



**Monthly Review: RPM Hypertension**

| | |
|---|---|
| Telephone Visit #: | 1 |
| Dates reviewed: | 09/01/20 to 09/28/20 |
| Critical BP (>180/120 mmHg or <80/50 mmHg): | yes - 188/77 9/6/20 (may have been an error, taken one minute after 116/79 reading?) |
| Abnormal lab values: | no |
| Hospitalizations, ER visits, or urgent clinic visits: | no |
| Self-Reported Adherence to medications: | Reports no Missed Doses |

**BP Meds:** take Carvedilol 12.5 mg twice daily
Has allergies to losartan (angioedema) and HCTZ (swelling)

Encounter Medications

Lab Results

| Component | Value | Date |
|---|---|---|
| NA | 142 | 01/30/2020 |
| K | 4.5 | 01/30/2020 |
| BUN | 13.0 | 01/30/2020 |
| CREATININE | 1.08 (H) | 01/30/2020 |

BLOOD PRESSURE SUMMARY:

| | | |
|---|---|---|
| # BP measurements, total: | 30 | |
| Average Blood Pressure, mmHg: | 145/78 | (goal <130/80) |
| Average Heart Rate | 67 | |

**PLAN PER PROTOCOL:**

1. Initiate amlodipine 5 mg daily *Newly prescribed medications and potential adverse effects were discussed in detail and all questions answered. Will follow up in one month.
2. No lab work indicated
3. Continue RPM

# Goals of Therapy

- Hypertension
  - Average BP <130/80 mmHg or <140/90 mmHg

- Type 2 Diabetes Mellitus
  - Average pre-prandial blood glucose of <140 mg/dL

* Participants should have 16 or more active days per rolling 30-day period for billing and med titration purposes

# RPM Workflow

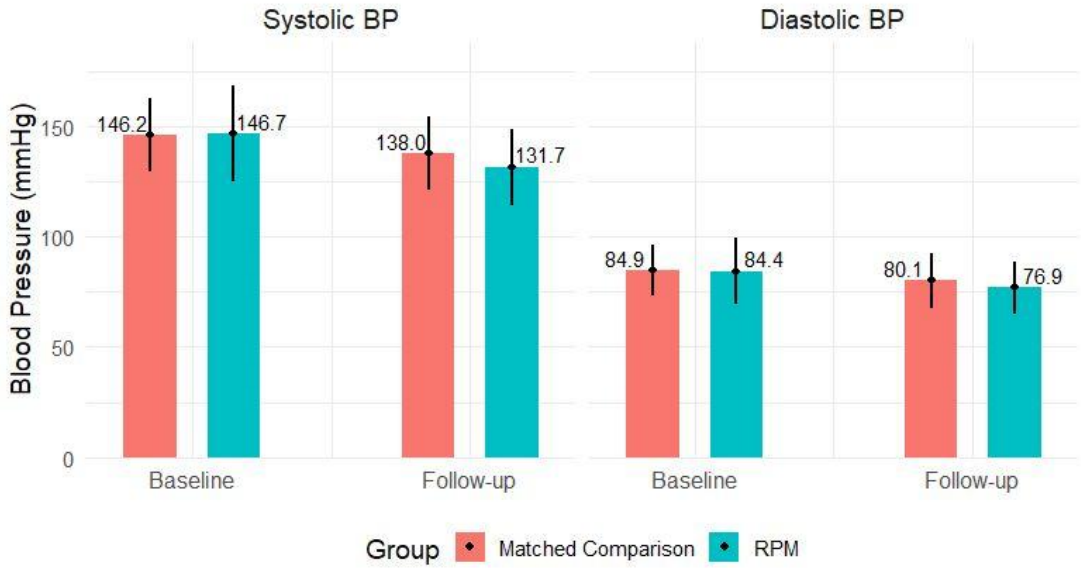
- Alert triggered
- RN safety protocol initiated
- Chart review
- Provider or PharmD escalation
- Medication titration
- Follow-up education
- Ongoing monitoring

# What Changed?

- Proactive detection
- Trend-based decisions
- Structured team workflow
- Documented time
- Reimbursement (99454, 99457)
- Improved patient engagement

# Our Real-World Outcomes

- UMMC RPM Program for HTN
  - Of 210 patients completing RPM, SBP was reduced by **15 mmHg** – nearly double the BP reduction seen of those receiving routine clinic care only
- Other UMMC programs
  - **CHF**: ~50% reduction in hospital days per year
  - **COPD**: nearly a 70% reduction in hospital utilization for COPD exacerbations
  - **DM**: ~2% reduction in HbA1c



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# RPM Implementation Challenges and Solutions

| Challenges | Solutions |
| --- | --- |
| Digital Literacy | Device onboarding and technical support |
| Alert Fatigue | Protocolized thresholds |
| Workflow Burden | Defined team member roles |
| Data Overload | Escalation algorithms and workflows |
| Billing Confusion | Centralized compliance process/billing specialist |

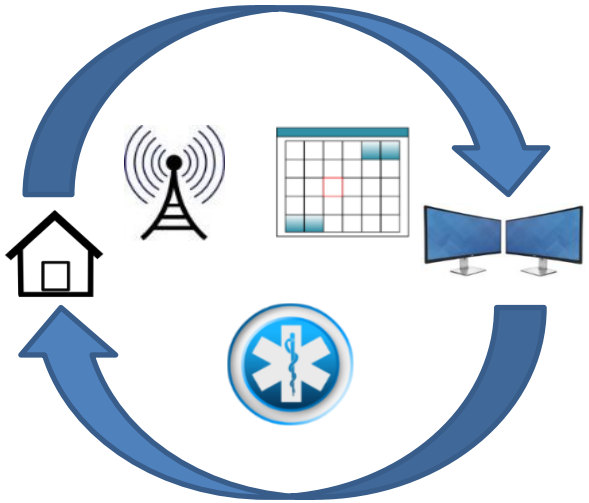
# Add CCM

# Mr. Carter Has More Than Hypertension

- Diabetes
- CKD
- Polypharmacy
- Cost concerns
- Transportation barriers

# Connected Care Pathway – RPM and CCM

**RPM: 6-12 months**



**Chronic Care Management**

**Primary Clinician – Patient Relationship**

# What CCM Adds

- 20+ minutes/month of non-face-to-face care
- Comprehensive care plan
- Multi-condition management
- Social determinant screening
- Care coordination

# Mr. Carter Under CCM

Now we see:

- Diet counseling
- Medication affordability discussion (across all medications)
- Diabetes goal review
- Nephrology coordination
- Transportation resource referral

Care becomes longitudinal

# CCM Challenges

| Challenges | Solutions |
| --- | --- |
| Time tracking | EHR tools |
| Documentation burden | Standardized templates |
| Patient consent | Enrollment scripting |
| Sustainability | Dedicated CCM staff |

# Add APCM (Future-Focused Model)

# What is APCM?

- Risk stratification
- Prospective payment
- Broader care coordination
- Flexible service delivery
- Quality metric accountability
- Population-level management

# Mr. Carter Under APCM

He is:

- Identified as high risk before crisis
- Proactively enrolled
- Potential integration of pharmacist-managed GDMT
- Risk-stratified follow-up cadence
- Preventive gaps closed
- Social needs addressed

This is system-level redesign.

# Model Comparison

# Side-by-Side Comparison

| Model | Reactive vs Proactive | Scope | Payment | Sustainability |
|---|---|---|---|---|
| **Traditional** | Reactive | Single event | None | Low |
| **RPM** | Condition-specific proactive | Biometric | CPT-based | Moderate |
| **CCM** | Whole-patient proactive | Multi-condition | Time-based | Moderate |
| **APCM** | Population proactive | Risk-based | Prospective | High |

# Implementation Reality

# Implementation Considerations

- Access and technology
- Workflow integration
- Staffing models
- Financial sustainability
- Health equity

# The Takeaway

# Key Lessons

1. Telehealth is not one thing – it’s a spectrum.
2. RPM is an entry point.
3. CCM expands scope.
4. APCM builds sustainability.
5. Workflow design determines success.

Don’t ask which telehealth model to implement. Ask which problem you are trying to solve.

# Questions?