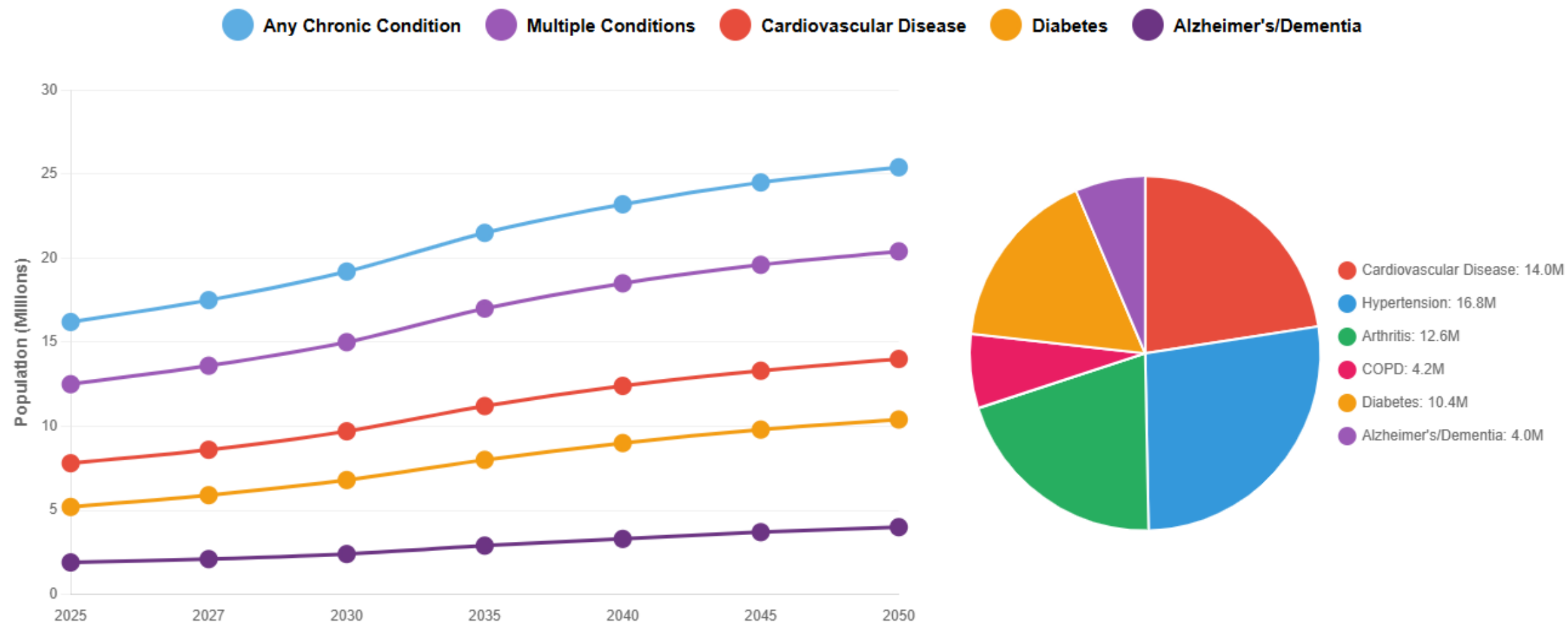# Leveraging Agentic AI to Enable Distributed Care for Rural Health Transformation

Today's rural healthcare systems are facing a perfect storm - an aging population surge, escalating chronic disease rates, and persistent workforce shortages.

Agentic AI offers a transformative solution by enabling distributed care models to extend rural patient care beyond limited brick and mortar, primary care resources. We automate patient engagement by delivering the **Right Information** to the **Right Person** at the **Right Time** and help deliver specialized expertise to underserved communities through intelligent systems that act autonomously on behalf of patients and providers.
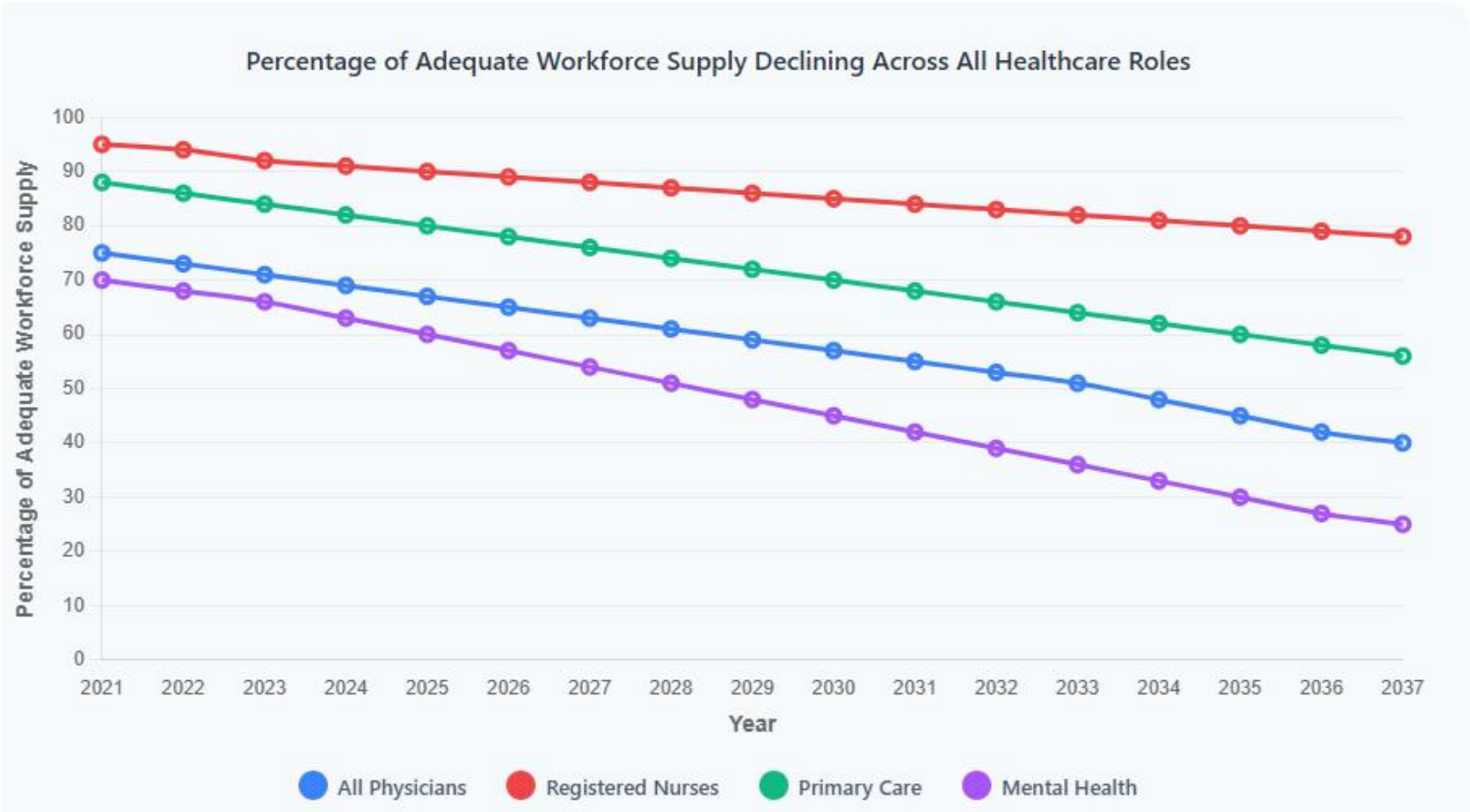
Chronic Conditions: Rural US Adults Age 40+ (2025 – 2050)

Legend: Any Chronic Condition ● Multiple Conditions ● Cardiovascular Disease ● Diabetes ● Alzheimer's/Dementia

Pie chart:
- Cardiovascular Disease: 14.0M
- Hypertension: 16.8M
- Arthritis: 12.6M
- COPD: 4.2M
- Diabetes: 10.4M
- Alzheimer's/Dementia: 4.0M

Sources:
• CDC National Center for Health Statistics. Trends in Death Rates in Urban and Rural Areas: United States, 1999-2019 (2021)
• CDC. Rural-Urban Disparities in State-Level Diabetes Prevalence Among US Adults, 2021. Prev Chronic Dis. 2025;22:E05
• CDC. Leading Causes of Death in Rural America (2024)
• Rural Health Information Hub. Chronic Disease in Rural America Overview (2024)
• Boersma P, et al. Prevalence of Multiple Chronic Conditions Among US Adults, 2018. Prev Chronic Dis. 2020;17:200130

US Rural Health Workforce Shortage Projections Through 2037

Percentage of Adequate Workforce Supply Declining Across All Healthcare Roles

Legend: All Physicians, Registered Nurses, Primary Care, Mental Health

60% Rural Physician Shortage by 2037
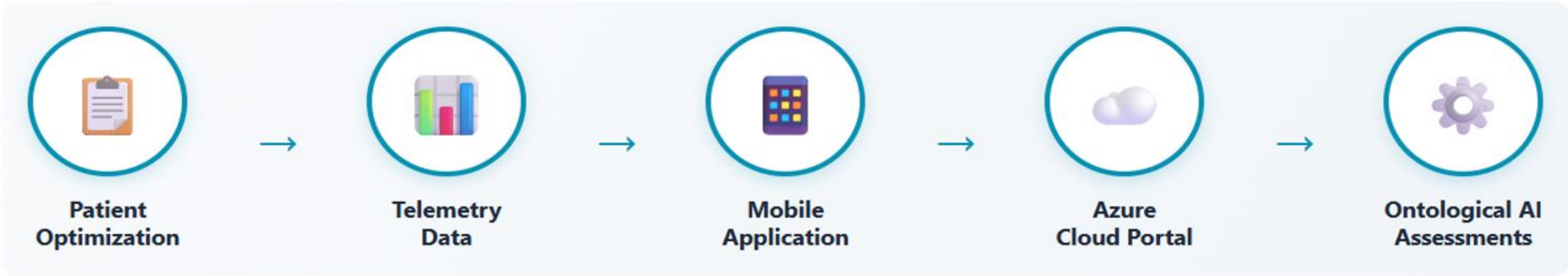
87,150 Primary Care Physician Deficit (Rural Areas)

13% Rural RN Shortage (vs 5% Urban)

91% Rural Counties with Primary Care Shortages

Sources:
1. HRSA National Center for Health Workforce Analysis (NCHWA). "Physician Workforce: Projections, 2022-2037." U.S. Department of Health and Human Services, November 2024.
2. HRSA National Center for Health Workforce Analysis. "State of the Primary Care Workforce, 2024." U.S. Department of Health and Human Services, November 2024.
3. HRSA National Center for Health Workforce Analysis. "Nurse Workforce Projections, 2022-2037." U.S. Department of Health and Human Services, November 2024.
4. HRSA National Center for Health Workforce Analysis. "State of the Behavioral Health Workforce, 2024." U.S. Department of Health and Human Services, November 2024.
5. U.S. Senate Joint Economic Committee. "Addressing Rural Health Worker Shortages Will Improve Population Health and Create Job Opportunities." January 2024.

Our Distributed Care Solution

Patient Optimization → **Telemetry Data** → **Mobile Application** → **Azure Cloud Portal** → **Ontological AI Assessments**

Agentic Workflow – Delivers the Right Information, to the Right Person, at the Right time

Nurse Triage Call Center
May Route Calls To

EMS
Emergency Medical Services

Community Based Paramedicine
Community health support

Urgent Care
Non-emergency urgent care

Follow Up
Scheduled follow-up care

Therapeutic Optimization with ORDS Methodology

Optimal: Care aligns perfectly with evidence-based best practices for the individual specific profile

Reasonable: Care follows acceptable clinical standards with minor opportunities for enhancement

Defensible: Care meets minimum standards but has identifiable gaps that must be addressed

Suboptimal: Care patterns indicate significant therapeutic optimization opportunities requiring intervention

Ontological AI Assessments

Synthesizes health profiles, medical history, connected device data, medication adherence data, and digital questionnaire responses to deliver evidence-based assessments supported by peer-reviewed medical literature.

This comprehensive analysis enables precise risk stratification and appropriate care team triage, ensuring patients receive timely, personalized interventions based on their unique health status.

A Force Multiplier for Rural Healthcare

Traditional Rural Health
Role Based Care Model

- Manual vital sign collection and monitoring

- Reactive crisis management approach

- Limited specialist access requiring patient travel

- Workforce shortage constraints

- Time-intensive documentation burden

- Facility-based care delivery
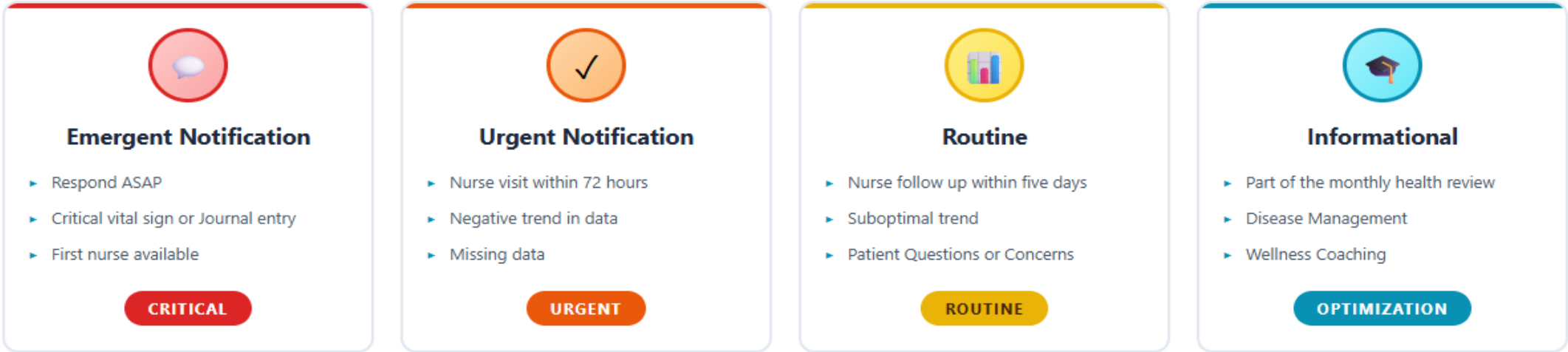
- Limited preventive care capacity

Technology Enhanced
Skills Based Model

- **1000s of patients monitored simultaneously**

- **Automated Data Collection**
  Bluetooth-enabled devices capture vital signs continuously

- **AI-Powered Intelligent Triage**
  ORDS methodology identifies patients needing intervention

- **Proactive Prevention**
  Evidence-based interventions before conditions deteriorate

- **Virtual Nursing Support**
  Remote nurses provide care coordination and patient education

- **Remote Specialist Oversight**
  Expert care delivered at home without patient travel

Real-time wellness data provides objective insights that support evidence-based care strategies, ensuring resources are allocated effectively and interventions are precisely timed.

Distributed Care Triage Notifications

Intelligent assessments leverage ontological AI analysis of patient demographics, trending biosensor measurements, digital questionnaire responses, and medication adherence data to deliver precise, actionable insights for care teams across the Distributed Care Network.
These insights enable care providers to prioritize effectively and conduct more focused, personalized interactions with patients.
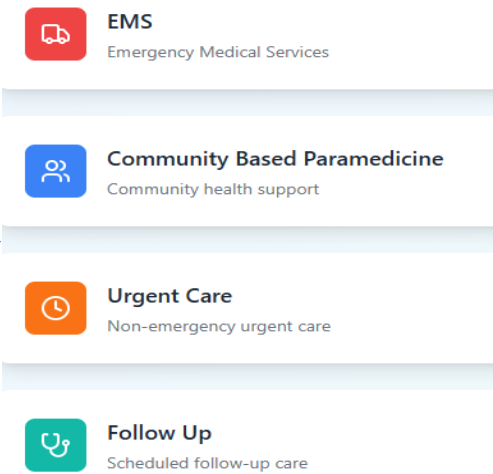
Emergent Notification

- Respond ASAP
- Critical vital sign or Journal entry
- First nurse available

CRITICAL

Urgent Notification

- Nurse visit within 72 hours
- Negative trend in data
- Missing data

URGENT

Routine

- Nurse follow up within five days
- Suboptimal trend
- Patient Questions or Concerns

ROUTINE

Informational

- Part of the monthly health review
- Disease Management
- Wellness Coaching

OPTIMIZATION

AI-Powered Distributed Care

Agentic AI offers a transformative solution by enabling distributed care models to extend limited clinical resources across vast rural geographies.

If necessary, Nurse Triage Call Center resources can leverage AI agents to intelligently route notifications to **EMS**, **Community Based Paramedicine**, **Urgent Care,** or **Follow Up Services**. Patients receive the right level of care from the right resource at the right time while optimizing resource allocation.

Nurse Triage Call Center May Route Calls To

EMS
Emergency Medical Services

Community Based Paramedicine
Community health support

Urgent Care
Non-emergency urgent care

Follow Up
Scheduled follow-up care

Device Data - Ontological AI Assessment

CarePath - UAT

ADD/INTAKE   PATIENT LIST   PATIENT   ADMIN   LOG OUT

Patient > Assessment

Assessment

Fred Doctor
Samsung, Frank

Generated: Tuesday, July 1, 2025 4:55 PM

Return to Patient List

⚠ **Results indicate potentially life-threatening conditions requiring immediate attention.**

NOTIFICATIONS

Consistently elevated blood pressures near or above critical levels may be an indication of a secondary cause for the HTN.

Primary consensus guidelines all define SBP > 180 mmHg and/or DBP > 120 mmHg as hypertensive crisis with or without any associated symptoms.

EMERGENT: A blood pressure reading in 'critical HTN' range (SBP > 180 mmHg or a DBP > 120 mmHg) has been recorded. The patient denies any associated symptoms.

URGENT: Heart rate over 100 is associated with high risk in heart failure patients.

EMERGENT: Lowered O2 saturation and relative tachycardia (70 - 100 bpm) may be a sign of clinical decompensation. Urgent patient assessment is recommended.

EMERGENT: Patient's O2 sat has dropped below level for notification.

EMERGENT: O2 saturation has fallen below the standard threshold for notification. (If this is chronic baseline < 94%, discuss adjusting notification thresholds w primary care.)

URGENT: Lowered oxygen saturation in a patient with known HEART FAILURE. Should be assessed for early decompensation.

With hypertensive urgency (DBP > 120) check for any symptoms of true Hypertensive emergency

PATIENT HISTORY
- Age: 61 years, 8 months
- Height: 188 cm cm
- Male
- Caucasian: N European
- Hypertension (HTN)
- COPD
- Asthma
- Heart failure (HF)

MEDICATIONS
- BAYER EXTRA STRENGTH ASPIRIN FOR MIGRAINE PAIN
- Daily Vitamin
- FLEXERIL
- OXYCODONE 2.5/APAP 500
- TRIAMCINOLONE

VITAL SIGNS
- Systolic BP: 205 mmHg
- Diastolic BP: 150 mmHg
- MAP: 168 mmHg
- Heart Rate: 165 BPM
- Oxygen Saturation (SpO2): 88 %
- Perfusion Index: 5.5 %
- Body Weight: 122.5 Kg

Supplemental Resources:

{2020 International Society of Hypertension Global Hypertension Practice Guidelines} "Consider screening for secondary hypertension in (1) patients with early onset hypertension (<30 years of age) in particular in the absence of hypertension risk factors (obesity, metabolic syndrome, familial history etc.), (2) those with resistant hypertension, (3) individuals with sudden deterioration in BP control, (4) hypertensive urgency and emergency, (5) those presenting with high probability of secondary hypertension based on strong clinical clues. In patients with resistant hypertension, investigations for secondary hypertension should generally be preceded by exclusion of pseudoresistant hypertension and drug/substance-induced hypertension. Basic screening for secondary hypertension should include a thorough assessment of history, physical examination (see clinical clues), basic blood biochemistry (including serum sodium, potassium, eGFR, TSH), and dipstick urine analysis. Further investigations for secondary hypertension (additional biochemistry/imaging/others) should be carefully chosen based on information from history, physical examination and basic clinical investigations. Consider referring for further investigation and management of suspected secondary hypertension to a specialist center with access to appropriate expertize and resources."

LESLEY CHARLES, MD, JEAN TRISCOTT, MD, BONNIE DOBBS, PhD,. Secondary Hypertension: Discovering the Underlying Cause. American Family Physician. October 1, 2017. 453-461 "Most patients with hypertension have no clear etiology and are classified as having primary hypertension. However, 5% to 10% of these patients may have secondary hypertension, which indicates an underlying and potentially reversible cause. The prevalence and potential etiologies of secondary hypertension vary by age. The most common causes in children are renal parenchymal disease and coarctation of the aorta. In adults 65 years and older, atherosclerotic renal artery stenosis, renal failure, and hypothyroidism are common causes. Secondary hypertension should be considered in the presence of suggestive symptoms and signs, such as severe or resistant hypertension, age of onset younger than 30 years (especially before puberty), malignant or accelerated hypertension, and an acute rise in blood pressure from previously stable

Clinical Notifications

› **I15.9** Secondary hypertension

› **I10** Essential (primary) hypertension (HTN): follow-up of potentially emergent findings

› **I50.9** Heart failure (HF): Follow-up of potentially emergent findings

› **J44.9** Chronic obstructive pulmonary disease (COPD): Acute decompensation (low O2 saturations)

Care Optimization

› **I50.9** Heart failure (HF): Follow-up of potentially urgent findings

› **I10** Hypertensive emergency

Observations

Oxygen Saturation (SpO2)	
88 %	📅 7/1/2025
Heart Rate	
165 BPM	📅 7/1/2025
Perfusion Index	
5.5 %	📅 7/1/2025
Systolic BP	
205 mmHg	📅 7/1/2025
Diastolic BP	
150 mmHg	📅 7/1/2025
MAP	
168 mmHg	📅 7/1/2025
Heart Rate	
79 BPM	📅 7/1/2025

Refinement Questions

Digital Questionnaire - Ontological AI Assessment

Connected Devices
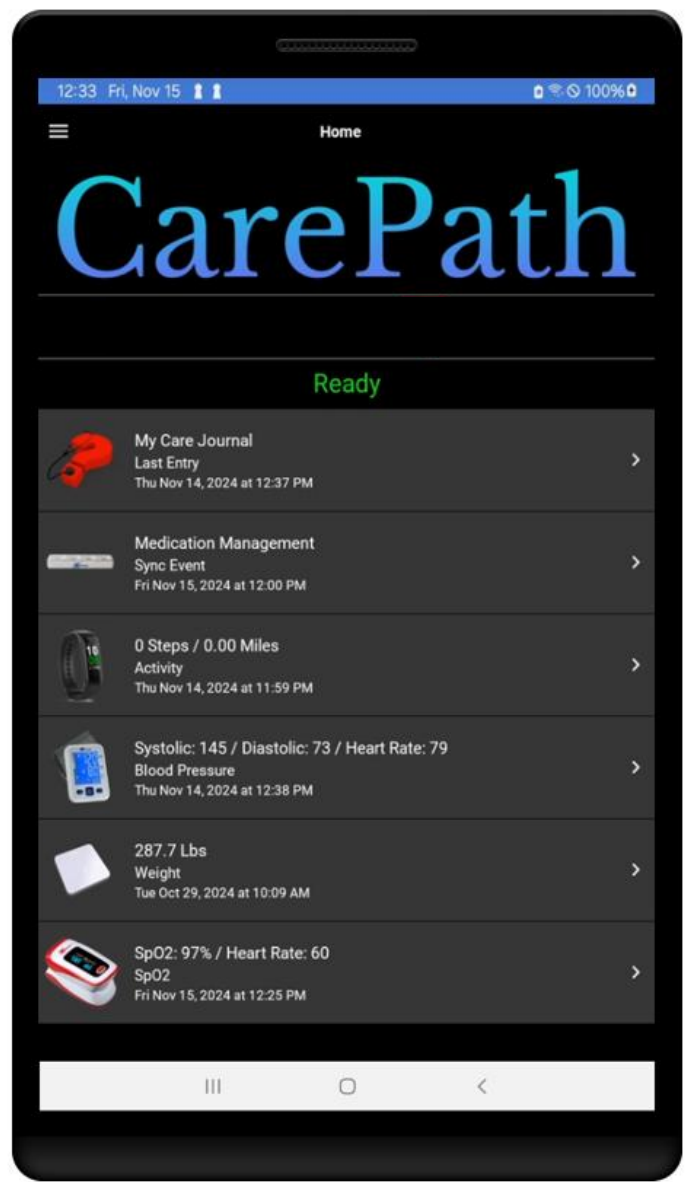
Bluetooth® 5.0

BP Monitor
- Two User capabilities
- AC Adapter Option
- Includes Cuff & Storage Bag

Pulse Oximeter
- Easy to read LED Display
- Slip resistant padding
- SpO2 and heart rate

Glucometer
- Five second test time
- 1,000 test memory
- Lancing device & Ten Strips

Weight Scale
- Large, easy to read digital display
- Safe, Low-Profile Design (3/4")
- Measures up to 397 pounds

Smart Pillbox
- Four Daily Compartments with Audible Alarms
- LED Indicator for each compartment
- Industry standard blister packs are sorted by caregiver or Pharmacy Partner

Thermometer
- Ear or Forehead Measurement
- Fever Warning
- Stores Twenty Readings

Medication Adherence

Navigating medication schedules poses a considerable challenge for rural patients who are who striving to maintain their independence.
Even with assistance from caregivers and family, many find it hard to consistently follow their medication regimens.

Program up to 4 compartments per day

LED's and an audible alarm indicate which compartment is next

Audible alarm and LED's continue until a compartment is opened (up to 90 min)

MedWell works with pre-filled Blister Packs or it can be self-sorted and filled

The right medication at the right time shouldn't be left to chance - it should be driven by intelligent technology and expert care.

Care Journals

Enhanced Clinical Decision-Making
When objective data and subjective feedback are combined for Ontological AI review,
it yields more accurate, comprehensive, and personalized evaluations, ultimately improving care decisions.

Our Ontological - Agentic AI approach doesn't just alert, it actively learns, predicts, and helps patients thrive in place.

Our Agentic AI Advantage – Right Information, Right Time, Right Person
Intelligent routing delivers critical information directly to the appropriate
care team, closing communication gaps and accelerating response times.

Let's start the conversation

Contact Information
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Supplemental Slide

Collaboration With the American Heart Association

Therapeutic Optimization and Continuous Quality Improvement CQI Collaboration

High Authority Content

Outcome validation, Continuous Quality Improvement (CQI) of source content

Actions

AHA population-based guidelines

Value-based outcomes assessment

CQI ORDS assessment of AkeLex knowledge engine performance
Client performance reporting
Identification of potential service enhancements

Demonstrated fidelity of transformation to digital platform
AHA   AkeLex

AkēLex *Smart Healthcare.*   **H**ealth**SaaS**™

Agentic Workflow for Value Based Care Patient Engagement Platform

Interactive AI platform applies resulting knowledge to track **O-R-D-S scoring*** of Health, Wellness, Prevention, Engagement, Therapeutic Optimization and Quality of Life metrics. Agentic routing to appropriate human resources for resolution.

KRB

Knowledge Repository Builder

AKE

Adaptive Knowledge Engine

Artificial General Intelligence (AGI) project with goal of automated knowledge acquisition

Microsoft .NET   Azure   Microsoft Fabric

Structured assessment data stored in AkeLex case server (AI-based resident record)

De-identified outcomes data sets power value-based outcome assessment and CQI

AkēLex   TRINITYAGI

***** O-R-D-S scoring: **O**ptimal, **R**easonable, **D**efensible, **S**uboptimal