

Elevating Healthcare Access in Rural and Underserved Communities



Nick Chuquín
nick.chuquin@rivhs.com



Stephanie Zumbuhl
stephanie.zumbuhl@droneup.com



John Costulis
jcostuli@odu.edu

Virginia Rural Healthcare Association
November 15-16, 2023
Blacksburg, Va.

Background / Context

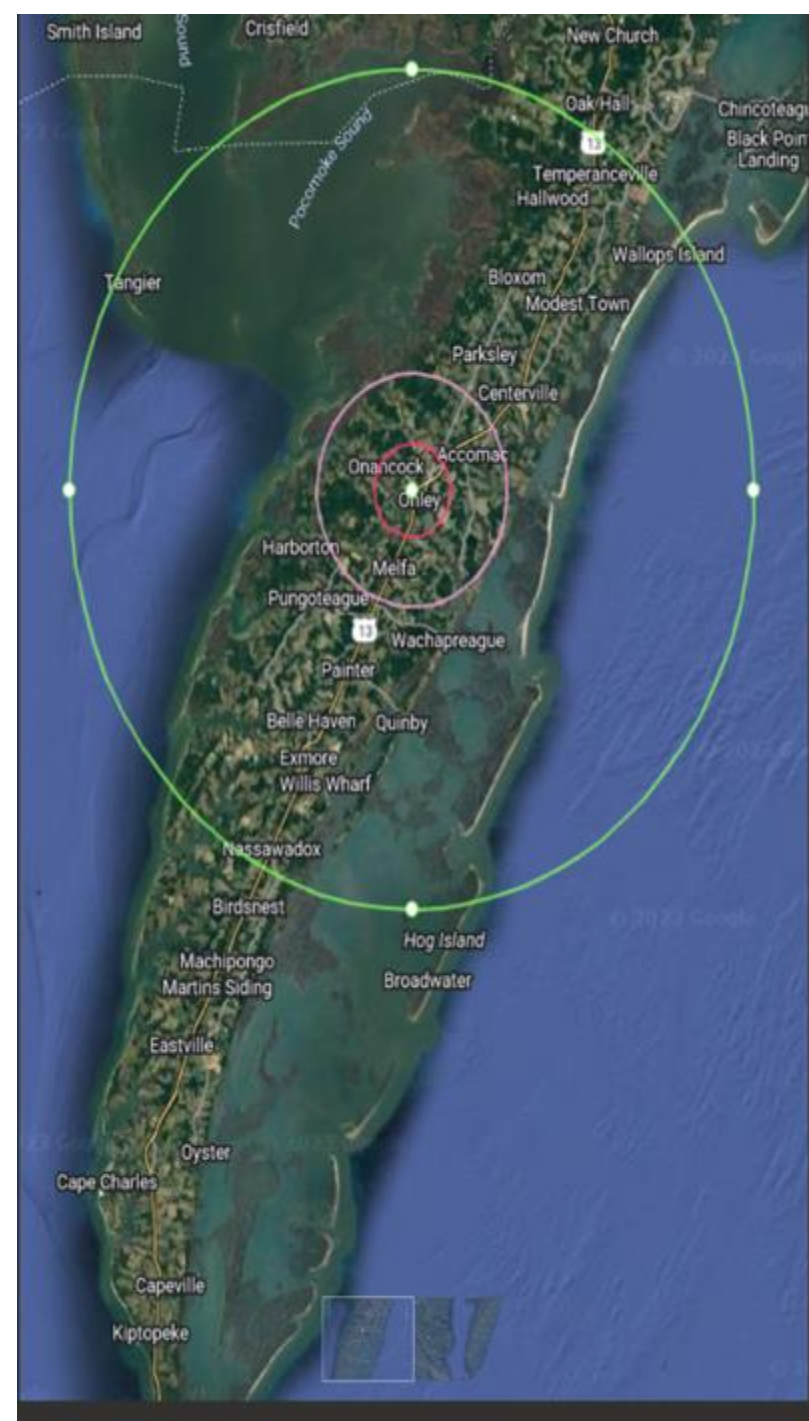
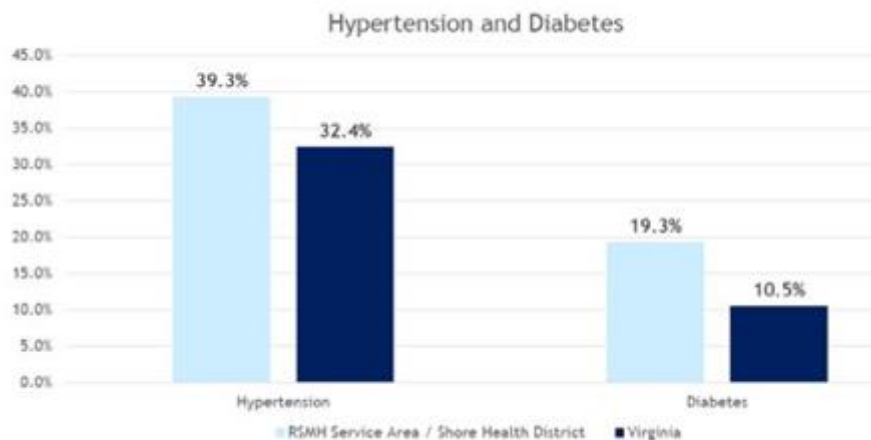
- There is a revolution occurring using new airborne approaches to moving people, goods, and providing services. “Think George Jetson”
- This new approach is called Advanced Air Mobility (AAM) - utilizes Vertical or Extremely Short Take off or Landing type aircraft
 1. Small Drones under 55lbs are called Unmanned Air Vehicles (UAV's)
 2. Autonomous Vehicles “Air Taxis ” will move people and in Urban areas; 2-4 people; 50 to 200 lbs
 3. Larger systems “Personal Air Vehicles” will move 4-6 people, 200-1000 lbs; aprx. 400 miles for Regional transports
- AAM Medical and Emergency Response applications include:
 - Prescription, blood test, and blood deliveries
 - Narcan, Defibrillators, advanced scene assessments
 - Organ transports
 - Patient transports
- Rural Health will be a major beneficiary of this technology



Elevating Health Care Access using Drones

The Solution

- Working together, Riverside, DroneUp, the Virginia Innovation Partnership Corporation (VIPC), and the Virginia Institute for Spaceflight & Autonomy (VISA) will engage in a multi-phased proof-of-concept period to build community support and study, test, demonstrate and evaluate medical drone delivery.
- Engage the community on the Eastern Shore to build excitement and public acceptance of the project, which will include delivery demonstrations of patient prescriptions faster, and eliminate the use of critical staff to deliver medical supplies, thus enabling homebound patients to receive much-needed medical supplies and prescriptions easily and quickly.



Elevating Health Care Access using Drones – Team Members

- Awarded Stage 1 GRANT in July 2023
- Only one in Va.
- 1 of 59 in the Country
- Proof of Concept

Federal - Dept. of Transportation
Strengthening **M**obility **A**nd **R**evolutionizing
Transportation Grant



Grant and Project Management



Patient Outcomes
Accessibility, and
Business Ops.

Drone Flight System and
Operations

Public Outreach and
Communications

Education and Workforce
Development



Elevating Health Care Access

Why are we doing this ?





RIVERSIDE

Mission:

To care for others

as we would care for those we love

- **to enhance their well-being and improve their health**

RSMH is DNV accredited

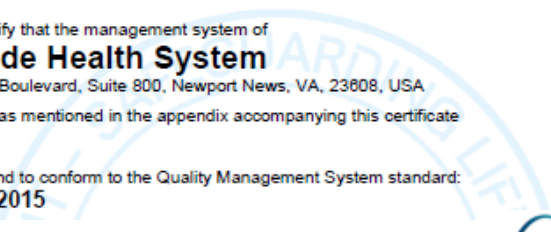


MANAGEMENT SYSTEM CERTIFICATE

Certificate no: 1000355418-MSC-ANAB-USA Initial certification date: 27 February, 2020 Valid: 24 February, 2023 – 23 February, 2028

This is to certify that the management system of **Riverside Health System**
608 Denbigh Boulevard, Suite 800, Newport News, VA, 23608, USA
and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the Quality Management System standard:
ISO 9001:2015



Community Health Needs Assessment

Our Community

RSMH focuses on providing care to Virginia's Eastern Shore, which consists of Accomack and Northampton Counties. This includes Accomack County's Tangier Island, which is only accessible by boat or plane. In addition to serving the residents of Accomack and Northampton Counties, RSMH also serves some residents of southern Maryland as well as the thousands of tourists that visit the region. There is one health district which encompasses both counties.

- **Eastern Shore Health District:** Accomack and Northampton Counties

Population (2025): 44,047

Population Growth (2020-2025): -0.1%

Median Age (2025): 47.4

Median Household Income (2025): \$53,376

Total Households (2025): 18,523

Racial & Ethnic Mix: 61% White, 31% Black, 2% 2 or more races, 1% Asian / Native Hawaiian, 5% other and 0% Native American; 10% of the population is Hispanic



Medically Underserved Areas and Populations

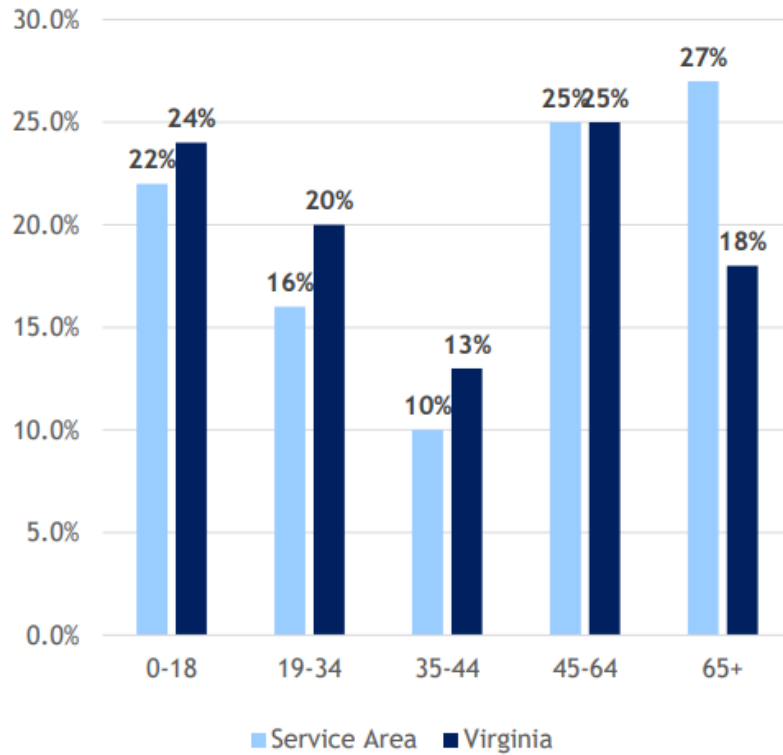
Locality	MUA / MUP Designation	Index of Medical Underservice Score	Status	Rural / Non-Rural
Accomack County	Primary Care - Medically Underserved Area	50.5	Designated	Rural
Northampton County	Primary Care - Medically Underserved Area	58.6	Designated	Rural

SOURCE: United States Health Resources and Service Administration muafind.HRSA.gov



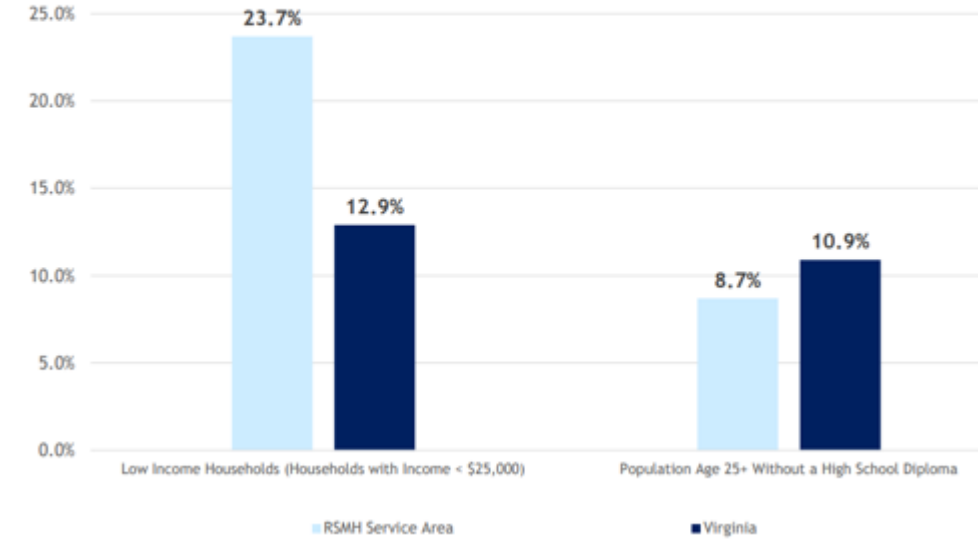
Community Health Needs Assessment

Population Distribution by Age

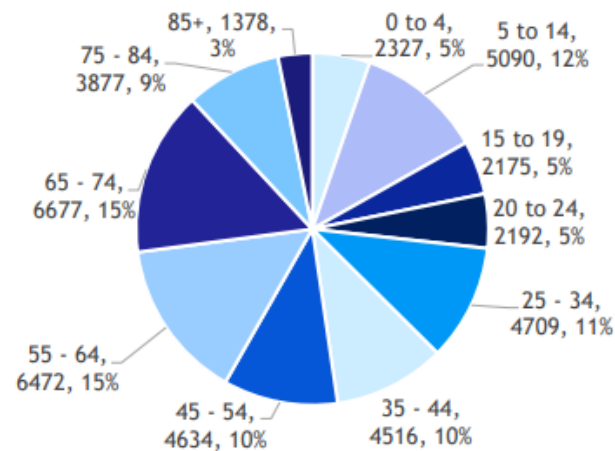


Source: US Census Data pulled 4Q 2021 utilizing Buxton reporting for the entire RSMH Service Area

Income and Education vs Virginia

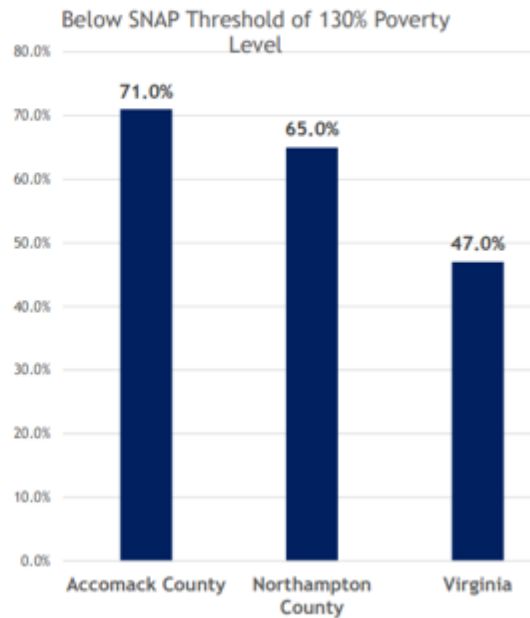
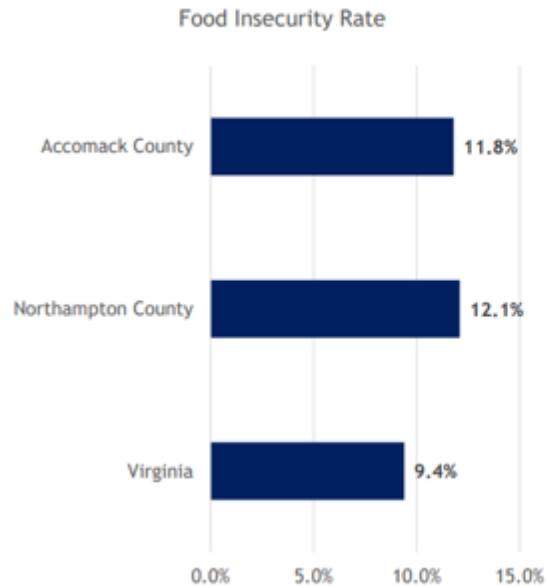


2025 Projections by Age

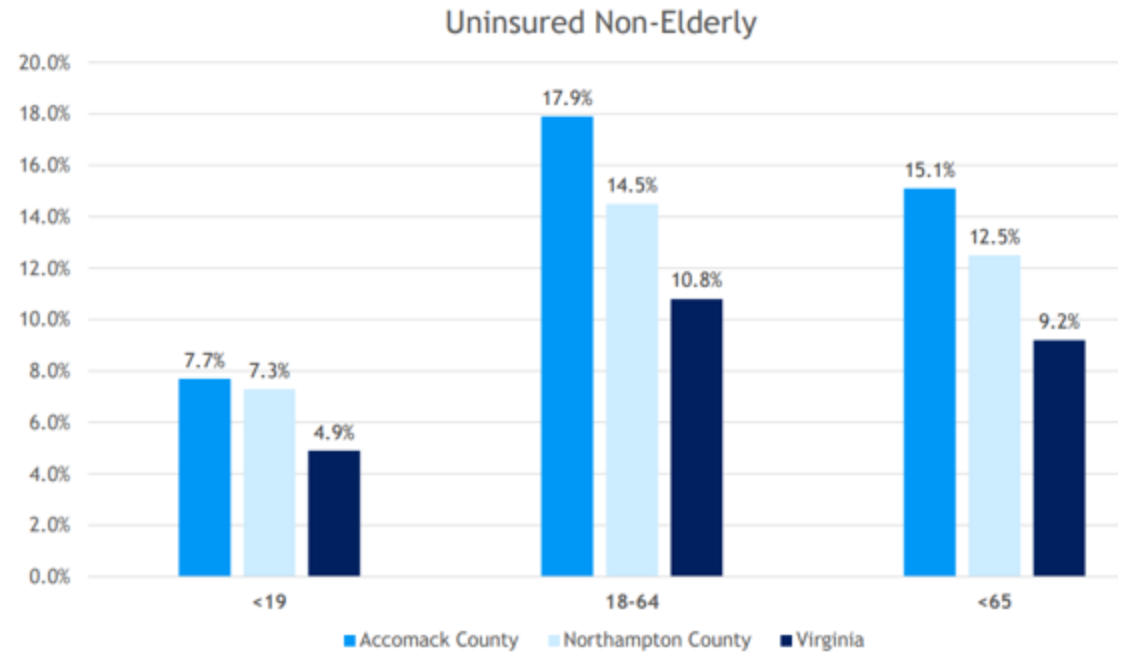


Community Health Needs Assessment

Food Insecurity

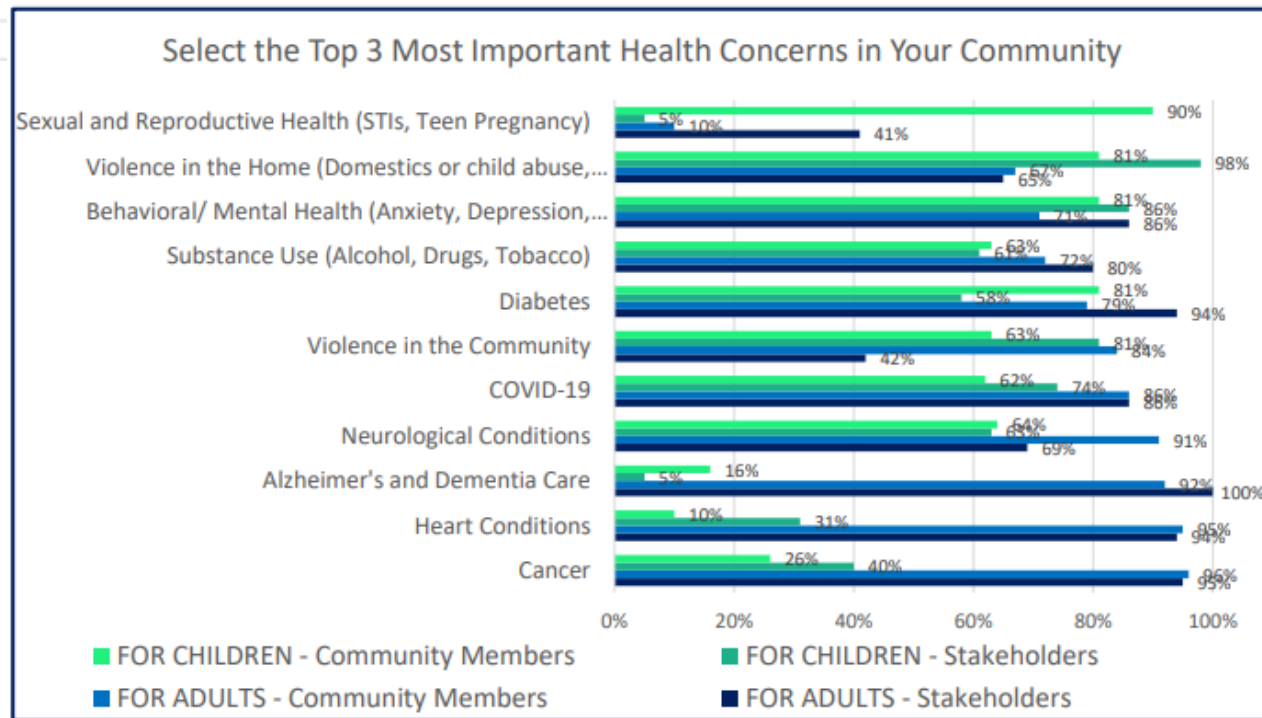
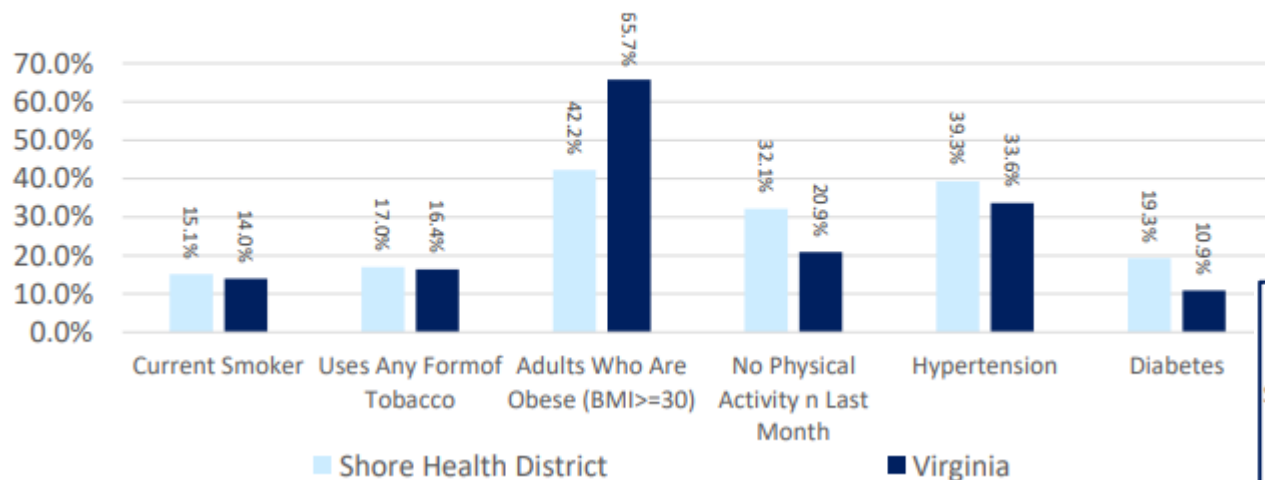


The Uninsured Non-Elderly



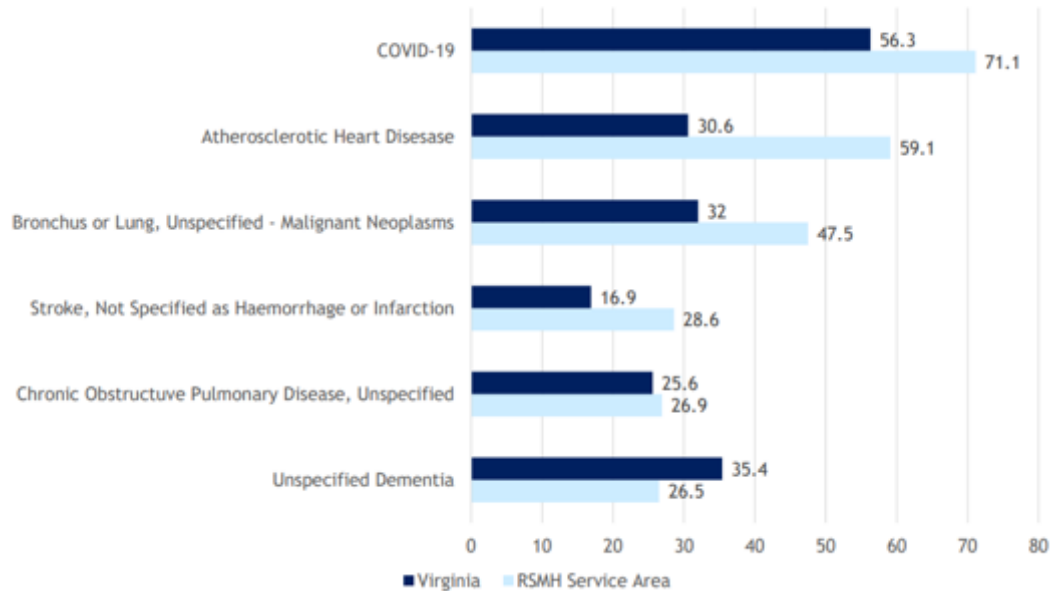
Community Health Needs Assessment

Health Snapshot

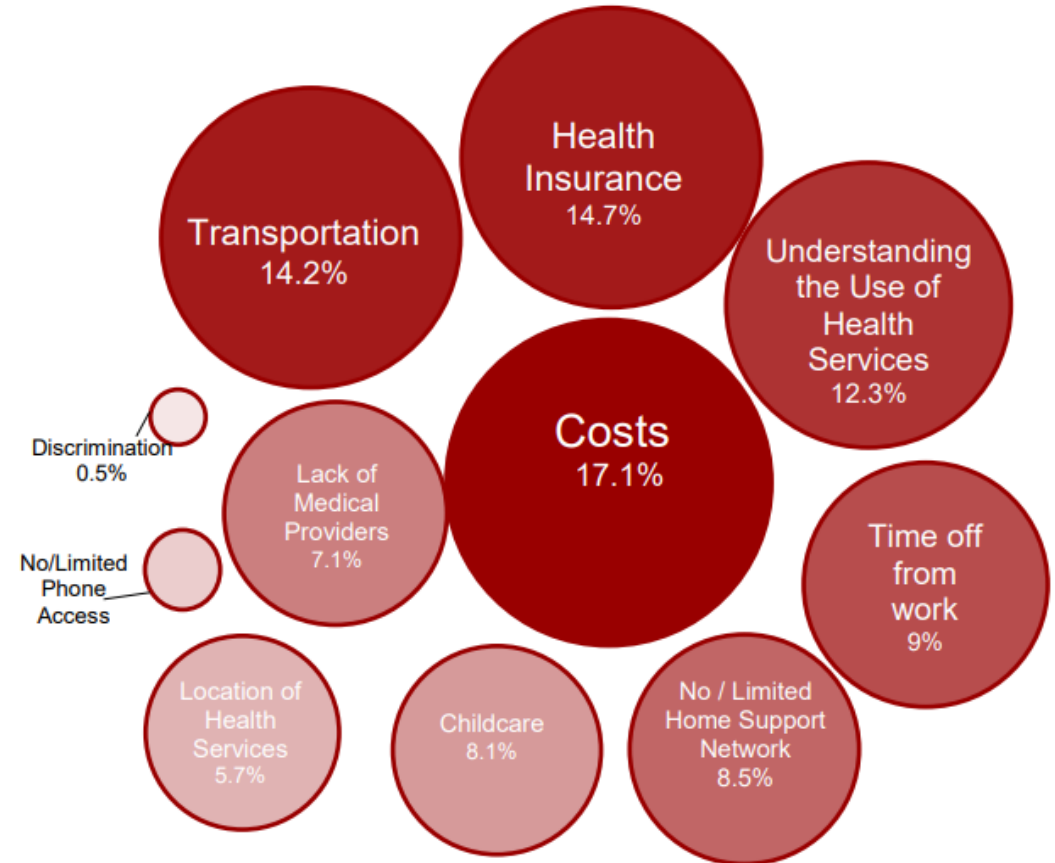


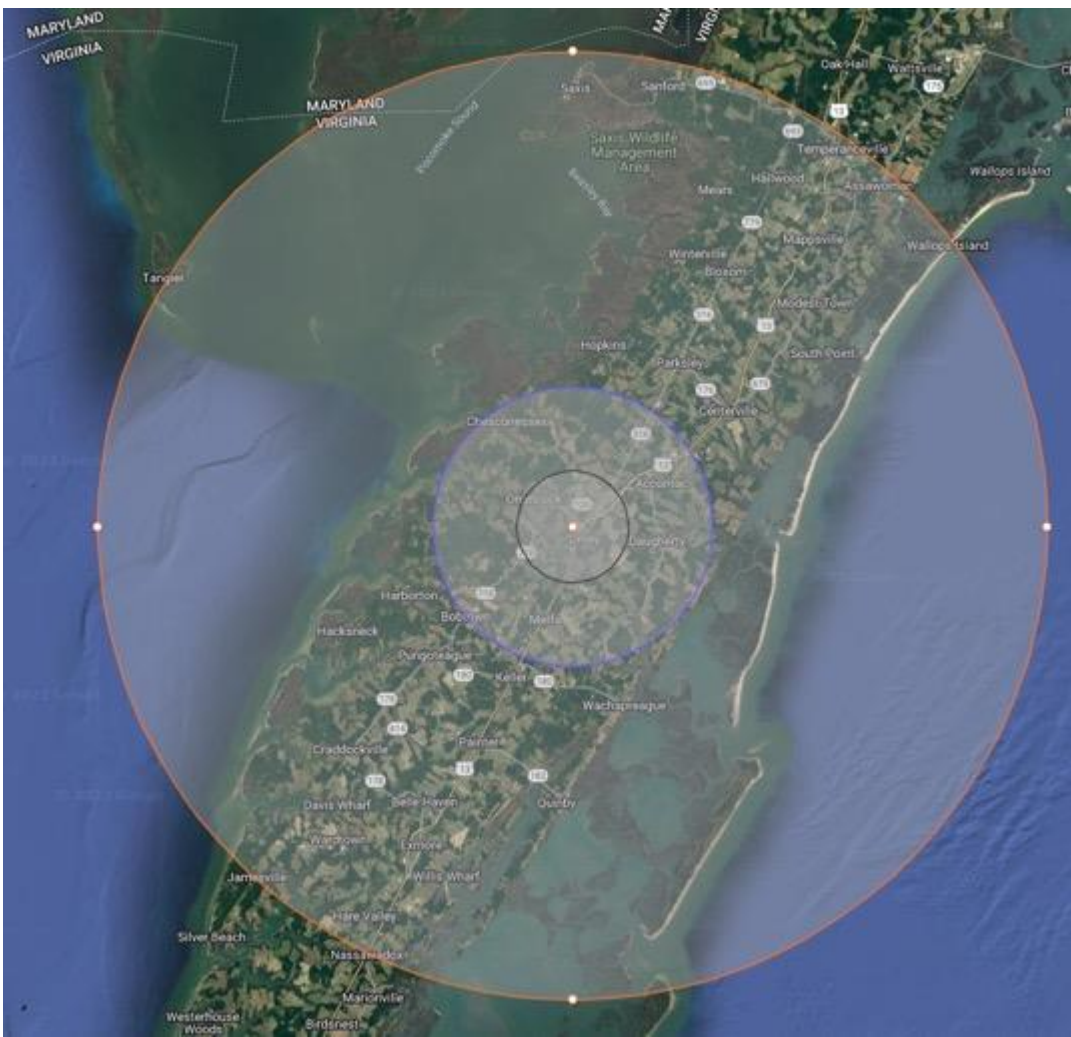
Community Health Needs Assessment

Age Adjusted Death Rate per 100K vs Virginia by Cause of Death (2020)



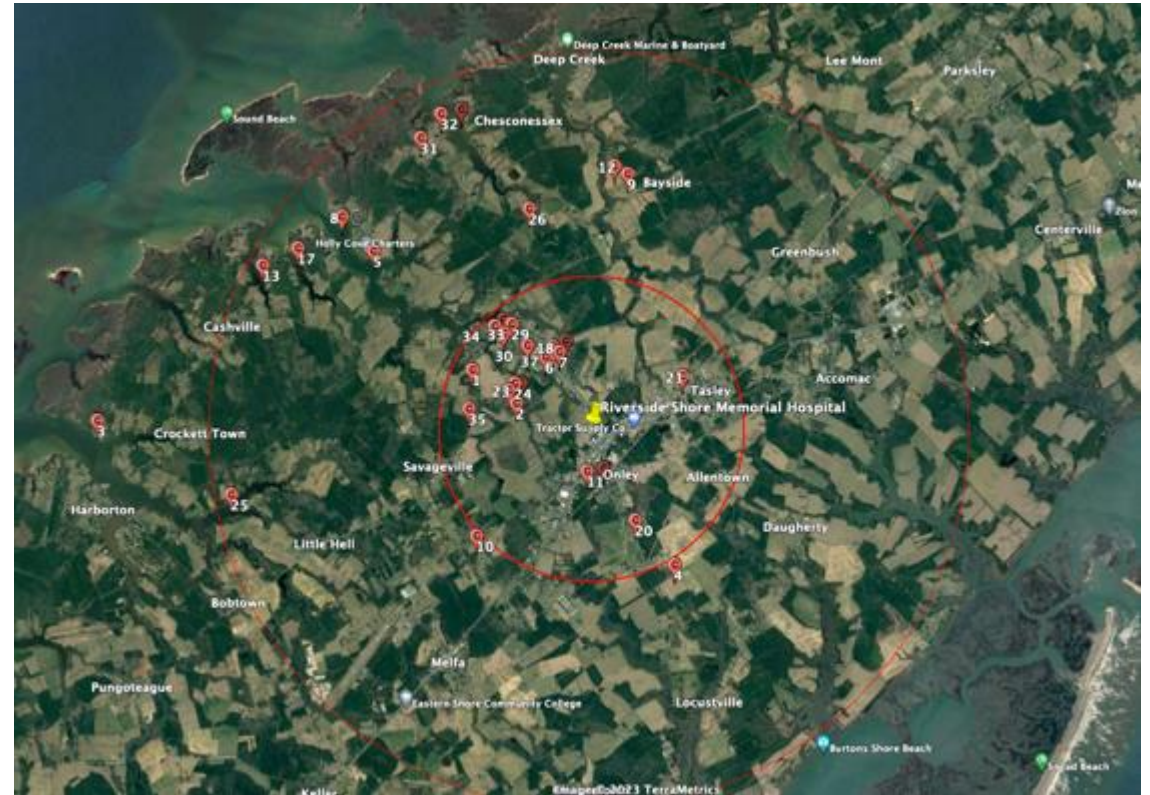
Top Community Issues Impacting Access to Healthcare





Drone Demo Video #1

Patient	Address	Distance from RVH in miles	Green/ Yellow/ Red	NOTES
11		0.6	Red	Front and back yards inundated with trees.
16		0.6	Red	PO BOX - Not real address - same address as #19
19		0.6	Red	PO BOX - Not real address
2		1.02	Yellow	Trees in front and back yard - potential to deliver on
7		1.04	Yellow	Apartment inside Senior living village. Has open area
6		1.06	Green	Front yard is wide open, no powerlines
			Green	Front yard has trees - back yard has potential to deliver
15		1.07	Green	- in person review needed (good)
37		1.08	Green	needs a tree assessment (Deliver in Driveway)
18		1.13	Yellow	Townhouse - could make a single point delivery spot
24		1.13	Green	Open front yard and backyard. No powerlines in front
			Green	Front yard is open, power lines run along front of street. Backyard has trees
27		1.15	Green	
23		1.17	Green	Open front yard and backyard. No powerlines in front
30		1.32	Green	Light tree cover in front yard, but there is deliverable
22		1.34	Green	Light tree cover in front yard, has deliverable space -
21		1.35	Red	PO BOX - Not real address - USPS location
20		1.39	Green	Good open front and back yard, also has open side
			Green	Google Earth not updated - open field - needs to be reviewed in person
35		1.61	Green	
33		1.65	Green	Light tree cover in front yard, has deliverable area -
29		1.67	Green	Have to review in person - looks deliverable but needs
1		1.71	Green	Open side yard and backyard, trees surround driveway
28		1.79	Green	coming towards house. Back yard looks open
34		1.8	Red	Private business- no deliverable space
10		2.09	Green	back yards
4		2.16	Green	Open front yard, back yard is non deliverable (trees).
26		2.92	Green	Deliver left side of house - needs in person review
9		3.32	Green	Street intersection - needs to be in person reviewed
12		3.4	Green	Front and back yard are clear - good delivery house
5		3.63	Green	(3.11 miles) Large open yard - good delivery areas



Operational Workflow Changes by Phase

Eastern Shore Medical Package Drone Delivery



Current State

Present Q2 2024

The Pavilion Pharmacy fulfills from the Newport News location, medications are sent over on daily inter-facility carrier and patient picks up from RSMH inpatient pharmacy

PCP -> Epic -> QS1 & NN -> Innertrack -> RSMH -> Pt

Turnaround time: ~24 hrs



Intermediate State*

TBD – TBD

An onsite satellite Pavilion Pharmacy at RSMH fulfills the medication prescription and patient picks up from RSMH out-patient pharmacy

PCP -> Epic -> RSMH -> Pt

Turnaround time: ~ same day

**not finalized, business case proposal is still pending*

Epic integration to replace QS1 planned for November 2023



Future State

Not Established

Workflow 1 (More likely scenario). The Pavilion Pharmacy fulfills from the Newport News location, medications are sent over on daily inter-facility carrier and the medication prescription, and it is delivered to the patient by drone

PCP -> Epic & NN -> Innertrack -> RSMH -> **Drone Up's System** -> Pt

Workflow 2 (Preferred). An onsite satellite Pavilion Pharmacy at RSMH fulfills the medication prescription and it is delivered to the patient by drone

PCP -> Epic -> RSMH -> **Drone Up's System** -> Pt



Gap analysis performed on Workflow 1

Prescription Delivery Process Map – Future State, Offsite Pharmacy

Eastern Shore Medical Package Drone Delivery



1. At a PCP visit the patient is educated about the Riverside Pharmacy Shore's prescription program & enrolled for drone delivery



2. Provider prescribes medication electronically in epic and the prescription is received by Riverside Pharmacy in Epic's WAM



3. The pharmacy technician builds patient profile, conducts benefits investigation and prepares prescription for order fulfillment, and dispensing is completed



4. A flight request is entered for enrolled patient and the location routing and clearance are verified and approved.



5. Patient is notified by IVR/myChart when dispensing is complete that the medication is ready for delivery scheduling via text/phone call



9. The inpatient pharmacy team packages the prescription(s) in approved shipping packaging



8. Drone delivery coordination and a time is scheduled with the patient with address/location verification confirmed before delivery



7. Riverside courier delivers shipment to RSMH inpatient pharmacy's receiving area



6. Pavilion staff prepares shipment to RSMH through Riverside courier (same day or next day, Innertrack/Jumtrack carrier pickup 1pm)



10. At confirmed delivery time, the drone is set-up with the package for delivery to the patient



11. At scheduled timeslot, the prescription medication is delivered to patient and patient confirms delivery receipt.



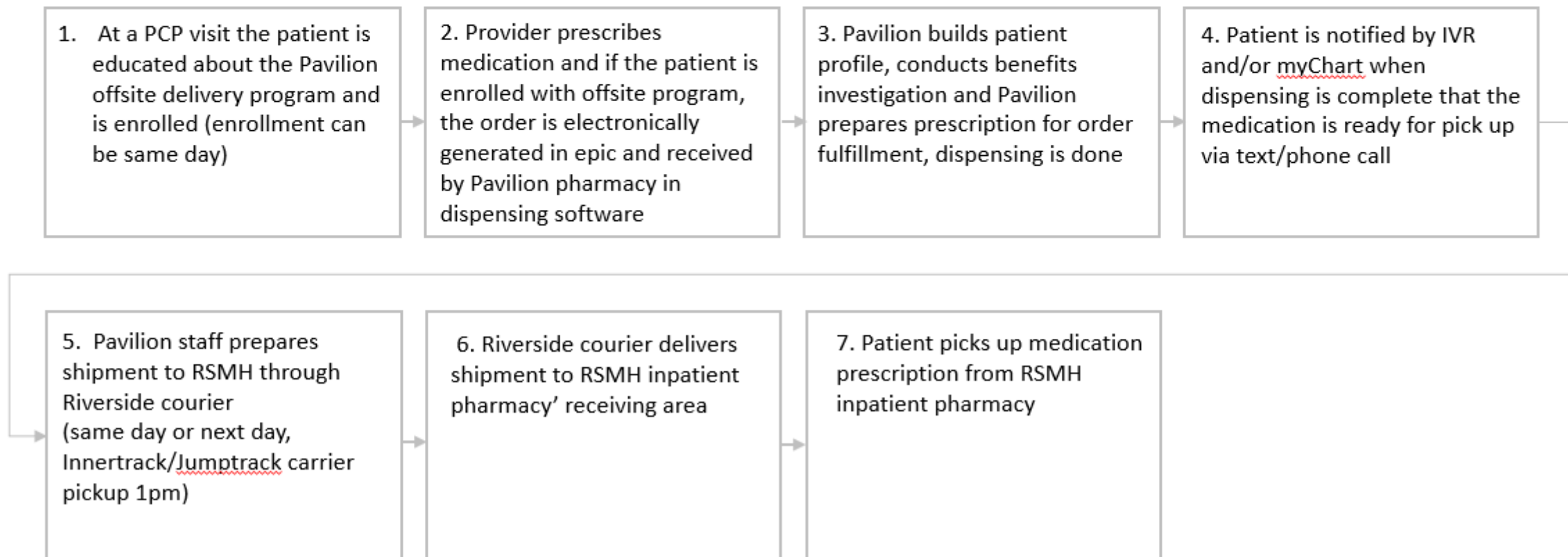
12. Post delivery follow up/ set up routine deliveries for established prescriptions

Prescription Delivery Process Map - Current State

Eastern Shore Medical Package Drone Delivery

Current Workflow: The Pavilion Pharmacy fulfills from the Newport News location; medications are sent over on daily inter-facility carrier and patient picks up from RSMH inpatient pharmacy

PCP -> Epic -> QS1 & NN -> Innertrack -> RSMH -> Pt

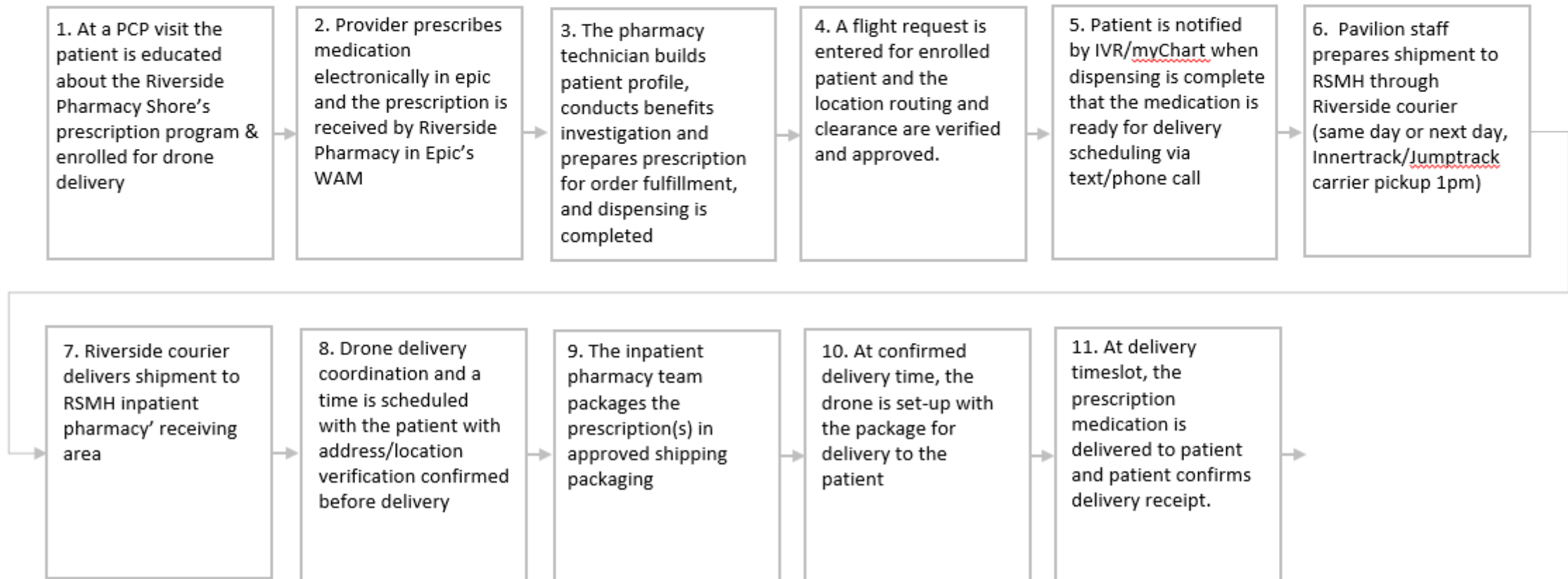


Prescription Delivery Process Map – Future State, Offsite Pharmacy

Eastern Shore Medical Package Drone Delivery

Future Workflow 1. The Pavilion Pharmacy fulfills from the Newport News location, medications are sent over on daily inter-facility carrier and the medication prescription, and it is delivered to the patient by drone

PCP -> Epic & NN -> Innertrack -> RSMH -> **DroneUp's System** -> Pt

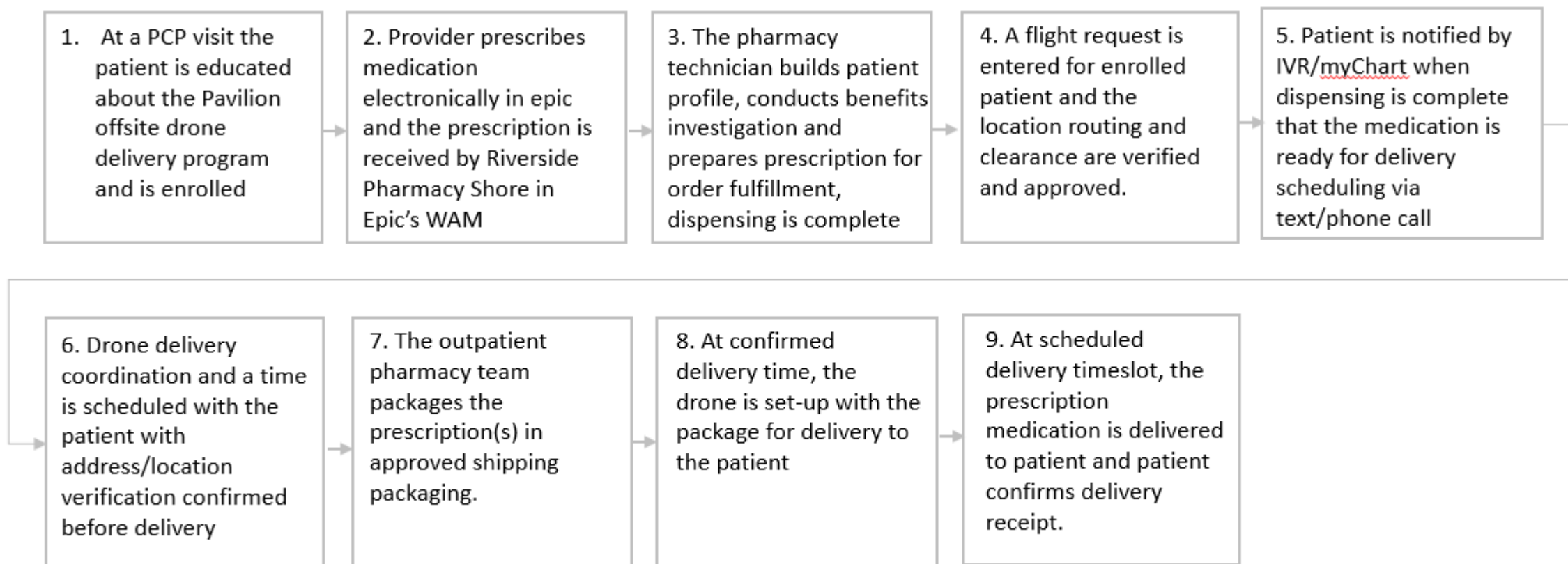


Prescription Delivery Process Map – Future State, Onsite Pharmacy

Eastern Shore Medical Package Drone Delivery

Future Workflow 2. An onsite satellite Pavilion Pharmacy location at RSMH fulfills the medication prescription and prescription is delivered to the patient by drone

PCP -> Epic -> RSMH -> **Drone Up's System** -> Pt



What does success look like?

- Improve access to medication
- Increase in medication adherence
- Reduction in average hypertension
- Reduction of unnecessary ED visits
- Reduction in hospitalizations
- Reduction in HF Readmissions
- Reduction of HF mortality

Elevating Health Care Access

How are we doing this ?

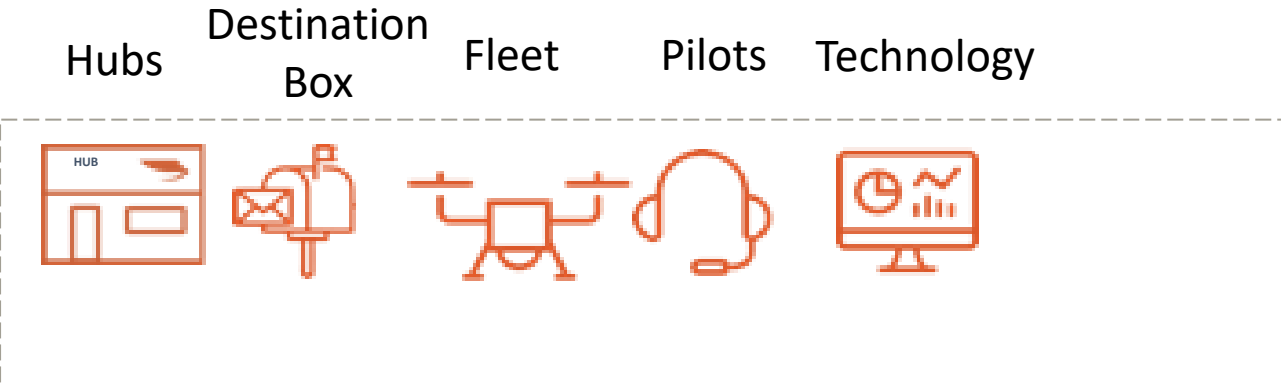


DroneUp Delivery Services

We build groundbreaking last-mile delivery programs for companies that demand the best in business operations, safety, and customer experience.

Our nationwide network of 34 drone Hubs in major metropolitan areas reaching 4 million households allows businesses to go from Hub to home in 30 minutes or less.

- Retail delivery
- Food delivery
- Last mile distribution
- Medical delivery
- Brand activation



Building our drone delivery program

PROOF OF CONCEPT DRONE DELIVERY IS POSSIBLE

DroneUp provides years of technology and operations experience optimizing drone delivery, introducing a drone program built for your business.



Fast to market proofs of concept through our existing Hub network or with a dedicated Hub

LEARN AND OPTIMIZE INTEGRATE INTO SUPPLY CHAIN



Measure results through tangible and quantifiable metrics, then optimize.

- Customer experience
- Delivery times
- Package and payload
- Order technology



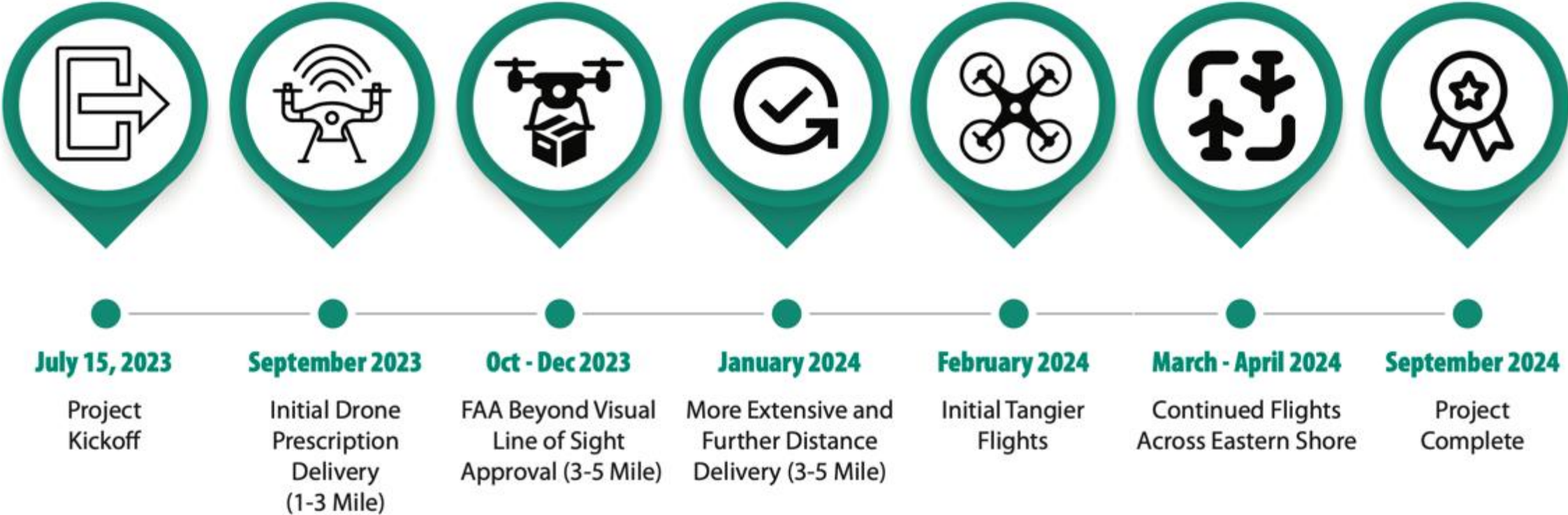
Clear path to scalable delivery with lower costs vs. conventional methods

- Expand customer reach
- Incremental capacity
- New markets entered

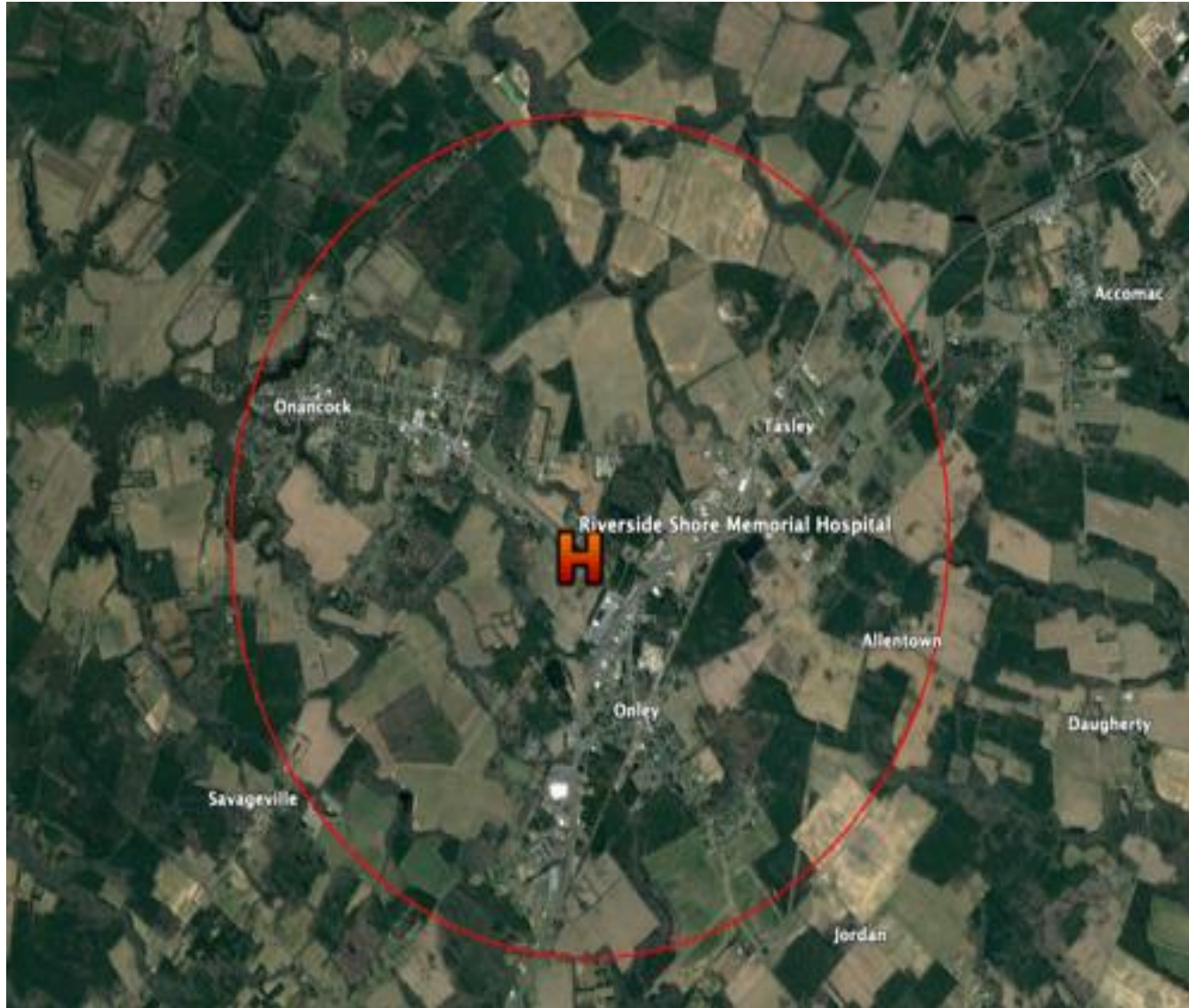
This project will be implemented by approaching drone delivery integration through a series of crawl, walk, run elements to enable the safest and most effective path towards a scalable, fully operational service for Accomack and Northampton counties on the Eastern Shore.

Drone Project **TIMELINE**

Elevating Health Care Access



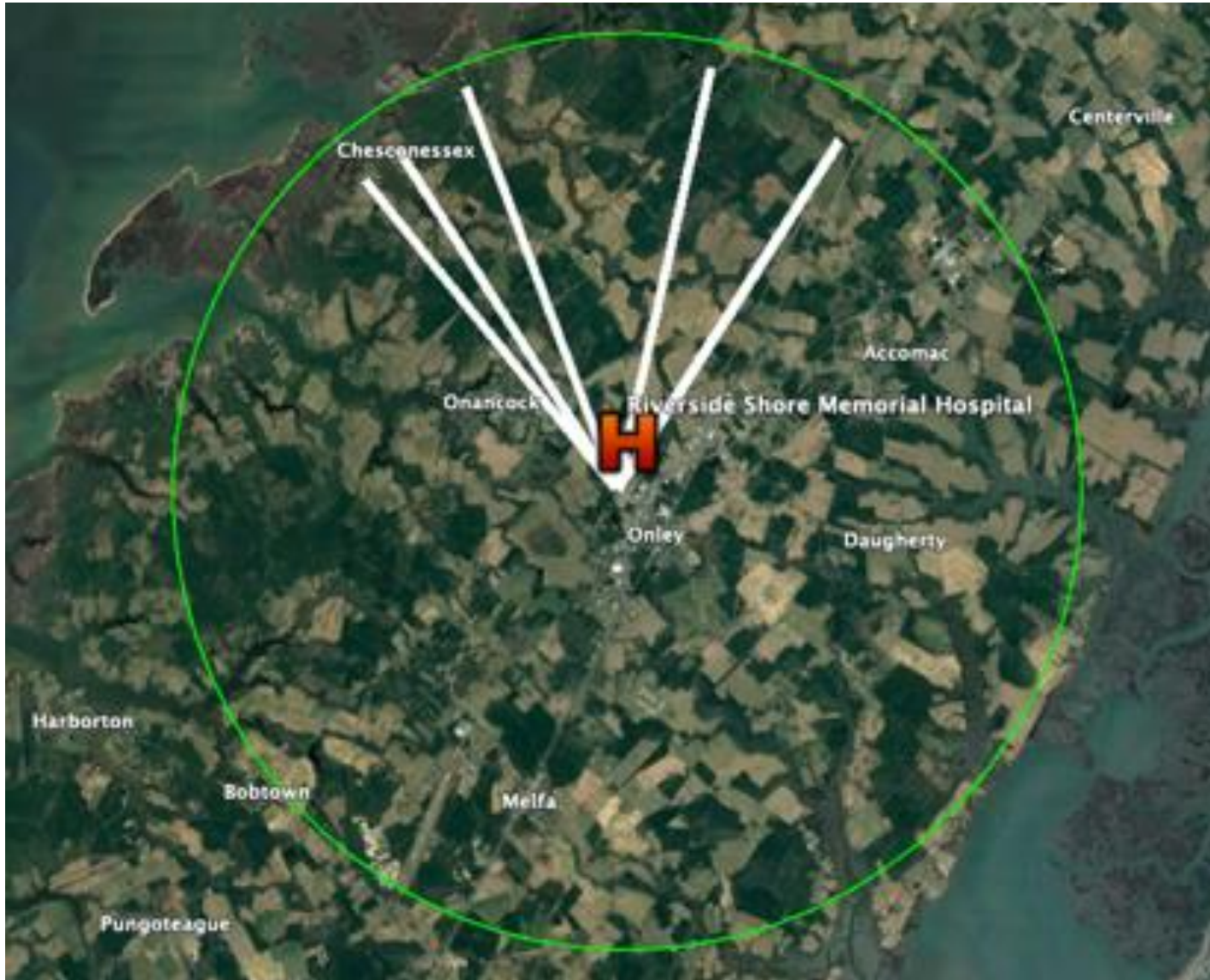
Demo #1 – Prototype Actual Medicine Delivery (Completed)



Key Accomplishments:

- 1-2 Mile Deliveries Started Oct. 2023
- Engaged FAA regarding project and payload classification approvals
- Formalized Medicine Tracking and Hospital Operations Process
- Establish Patient Candidates
- Built Pilot Community Engagement
- Formalized Delivery Paths and Operations
- Conducted Deliveries
- Repeated Delivery Plan Implemented With Lessons Learned
- Developed and Distributed Press Releases
- Collected Flight Data Parameters

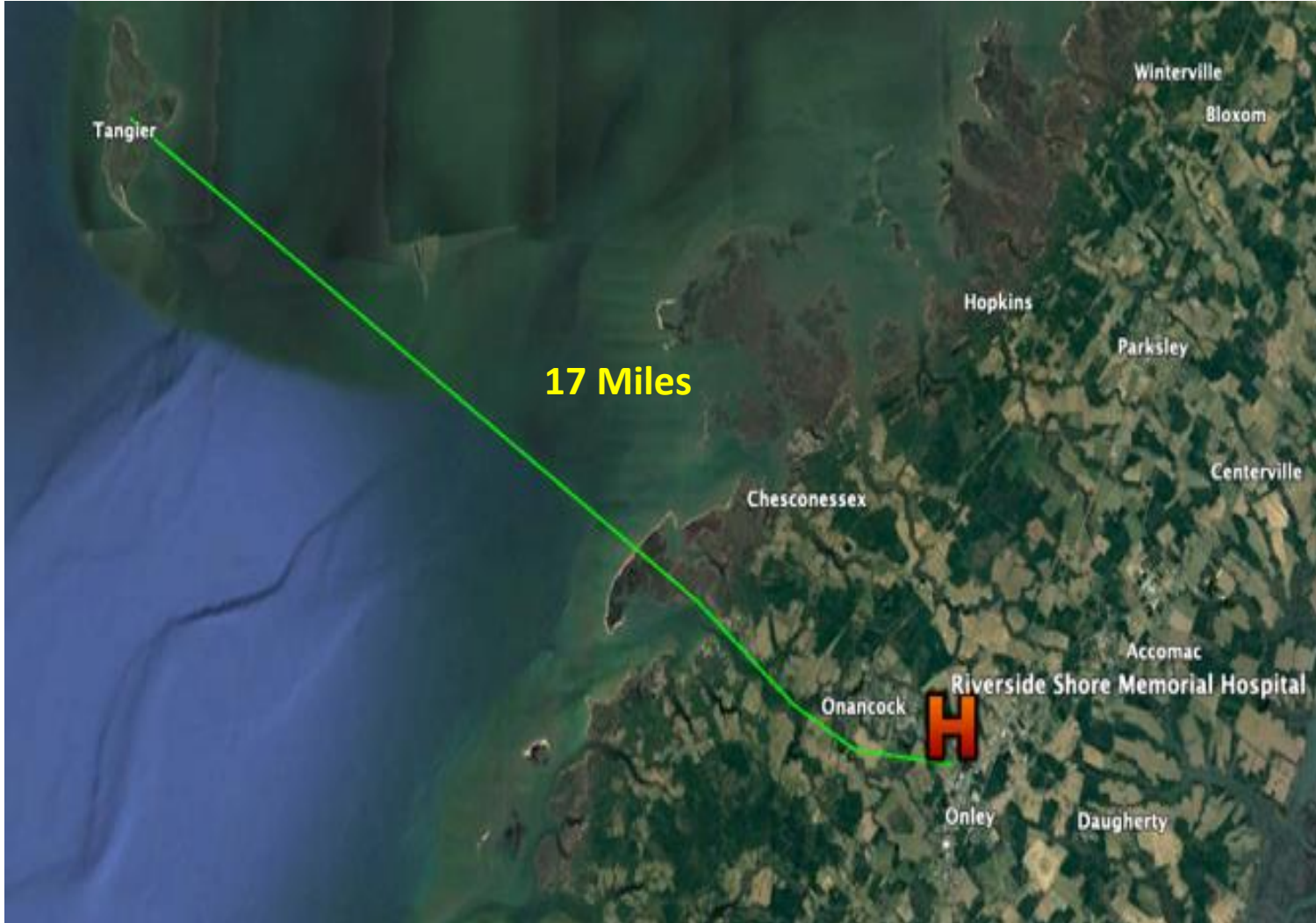
Demo #2 – Extended Line of Sight Deliveries (In Work)



Key Elements in Work:

- 3-5 Mile Deliveries to start January 2024
- Updating Medicine Tracking and Hospital Operations Process
- Establishing Patient Candidates
- Continue Pilot Community Engagement
- Formalizing Delivery Paths and Operations
- Formulating Models and Simulations to optimize routes, maximize deliveries, and predict health impacts and disparities by geographical regions
- Collecting Flight Data Parameters

Demo #3 – Beyond Visual Line Of Sight Deliveries to Tangier Island (In Work)



Key Elements In Work :

- 5 to 17 Mile Delivery To Tangier Is.
- Working with FAA for approvals
- Evaluating Air Volume Awareness approaches to ensure Safety of Flight and Detect And Avoid Methods
- Select long flight UAS
- Automate Pilot Community Awareness
- Formalize Delivery Paths and Operations
- Conduct Simulated Deliveries
- Collect Flight Data Parameters
- Finalize Data Metrics collection methods to validate Patient Outcome

Project Stage 2 Proposal Planning:

- In order for the Team to successfully win a DOT SMART Stage 2 Grant we must:
 - Retire the risks associated with this Stage 1 proof of concept to show the feasibility to scalable operations
 - Demonstrate a repeatable technology infusion approach for others to deploy
 - Build the right types of data sets, models, and analytical tools to validate the data collection that lays the ground work for proving the hypothesis related to Patient Outcomes
 - Build the right future partnerships and community engagement to enable scalability and regional operational deployments. **Note: this could involve VRHA and Healthcare Systems within Va.**
 - Develop the team and write the proposal in 2024

We would like to leave you with this message !!

First Medications Delivered by Drone

Check us out if you would like to join us @

<https://visaatodu.org/elevating-health-care-access-project/>

