



## The Health Wagon

Applications of Virtual and Augmented Reality and Artificial Intelligence in Health Care

### Presenters:

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Clinical Director,

DNP, FNP-BC, PPCNP, FAANP

# Mission

The Health Wagon provides compassionate quality health care to the medically under-served people in the mountains of Appalachia.



© Tim & Angel Cox



1998  
Sister Bernadette  
Kenny, MMM  
DIOCESE OF RICHMOND, VIRGINIA



# In the Beginning



# The New York Times



## Unbridled Spirit

### The Early Days



## The Health Wagon's 1<sup>st</sup> Mobile Unit

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# Experienced Nurse Managed Leadership Leading the Oldest Mobile Clinic in the Nation



# Innovation

- Nurse Practitioner Managed Clinic
- Health Wagon services comprised of five mobile units and three stationary clinics
- Provide dedicated medical, dental, vision and specialty care to 13 sites in Dickenson, Buchanan, Russell, Lee, and Wise counties on a weekly to biweekly basis
- Services are rendered free of charge; however, patient co-pays for appointments (\$10)
- Use generic drugs, when possible, rely on clinician's diagnostic abilities, unprecedented collaboration with multiple entities, holistic care approach

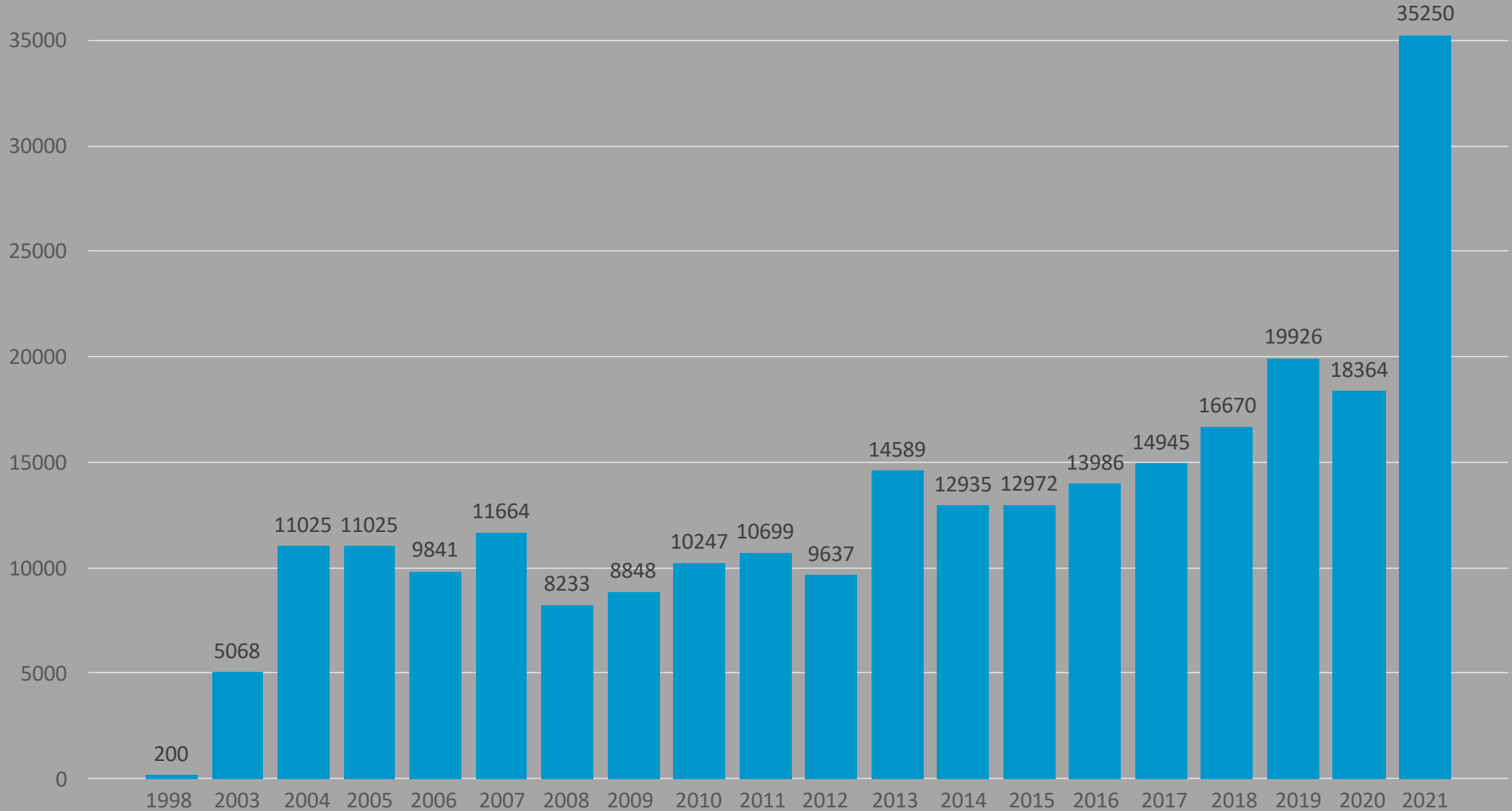


# Patients of the Health Wagon

- The Health Wagon is a medical home to over **10,857** patients as a free and charitable clinic
- Patients mostly live in Lee, Scott, Wise, Dickenson, Buchanan and Russell Counties
- The average age of the Health Wagon patient is 41 – serve all ages
- 60% are female
- 40% are male

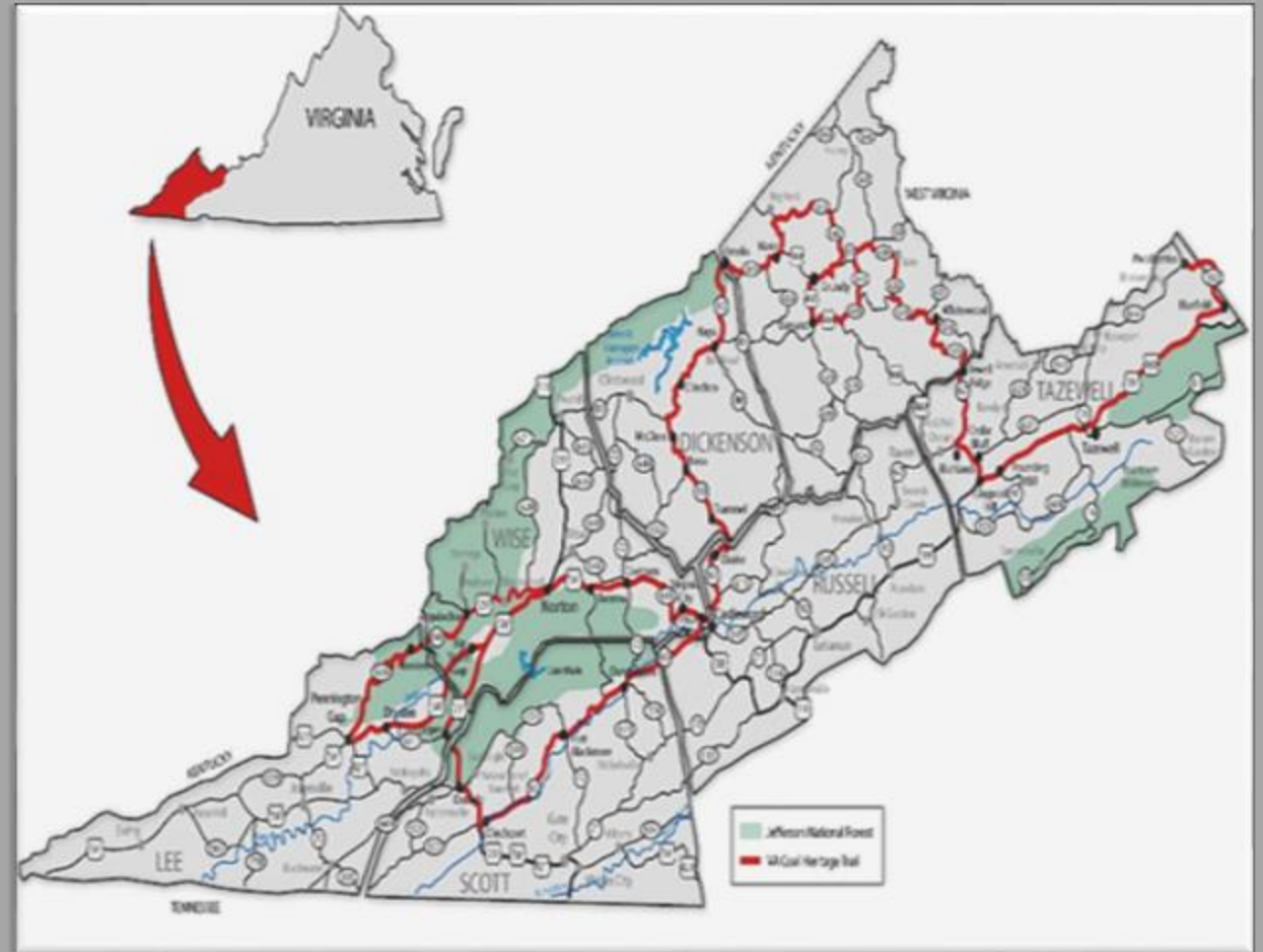


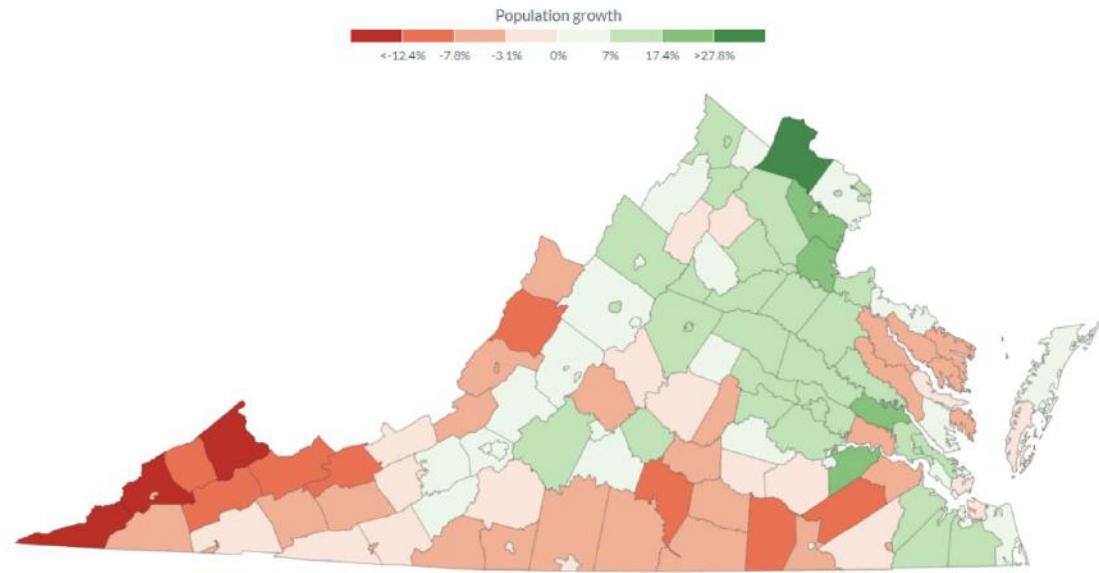
# The Health Wagon Encounters



# Service Area

- Lee, Scott, Wise, Dickenson, Buchanan and Russell Counties
- The terrain is mountainous, covering 1,715 square miles, with numerous locations being geographically isolated
- Many residents lack adequate transportation which results in lack of access to health care





# The Rural – Urban Divide

- 5 of the 10 wealthiest counties in the country are in Virginia – Rankings:
  - 1<sup>st</sup> - Loudoun County
  - 2<sup>nd</sup> - Falls Church
  - 3<sup>rd</sup> - Fairfax County
  - 8<sup>th</sup> – Arlington County
  - 10<sup>th</sup> - Fairfax City
- Within Virginia there are 33 counties or cities that have a larger income gap with Loudoun County (median household income is \$142,299 per year).

Population changes by county between 2010 and 2020. Map courtesy of Virginia Public Access Project.

“NO OTHER STATE, LOMBARD SAID, HAS SUCH A VAST DISPARITY BETWEEN ITS RICHEST COUNTY AND ITS POOREST COUNTY”

- Hamilton Lombard, *Estimates Program Manager for the Demographic Research Group at the Weldon Cooper Center for Public Service*

- Health Wagon service area:
  - \$ 39,820 Scott County
  - \$ 39,758 Russell County
  - \$ 38,888 Wise County
  - \$ 32,888 Lee County
  - \$ 31,956 Buchanan County
  - \$ 29,932 Dickenson County
  - \$ 29,000 Norton City

- Deaths outweigh Births:
  - In 1980, the median age in Arlington was 32 and Highland County was 33.
  - By 2019, the median age in Arlington was 35 and Highland County increased to 59.



# A Strong Voice for Central Appalachia 30 Years of Leadership



# Poverty Remains

Robert Kennedy visited the Appalachian regions of Southwest Virginia and Eastern Kentucky in 1968 to evaluate the effects of the four-year war on poverty...



# Sacrifice Zone and Historical Trauma

- Mountaintop Removal is the strip-mining practice of blasting off the tops of mountains so that coal can be mined. This practice is prevalent in the Appalachian mountains.
- More than 1,000 square miles of mountains have been destroyed in Appalachia.
- Hundreds of miles of streams have been polluted with heavy metals and acid mine damage.
- Flooding due to runoff from MTR sites is causing widespread property damage and loss of life.
- Property values have decreased as much as 90% due to damage from blasting and coal dust.



# Health Wagon Challenges

- Small rural communities that do not attract the level of services available in urban developed communities
- Tremendous need for primary, preventive and specialty health care
- Economic disparity
- Geographic isolation
- Low level of education
- High unemployment rates
- Low rates of health insurance coverage
- Lack of healthcare resources
- Lack of social resources
- Poor health status & disparities in Central Appalachia
- Increasing elderly population
- Limited transportation
- Food insecurity
- High percentage of injury deaths (coal, agriculture) / high disability rates
- Health Professional Shortage Area (Dentists, Mental Health, Primary Care, Specialists)
- Shorter life expectancy
- High depression rates / suicide / overdoses

# Death rates from common causes are higher in the Health Wagon's service area than in Virginia overall

People in the service area are:

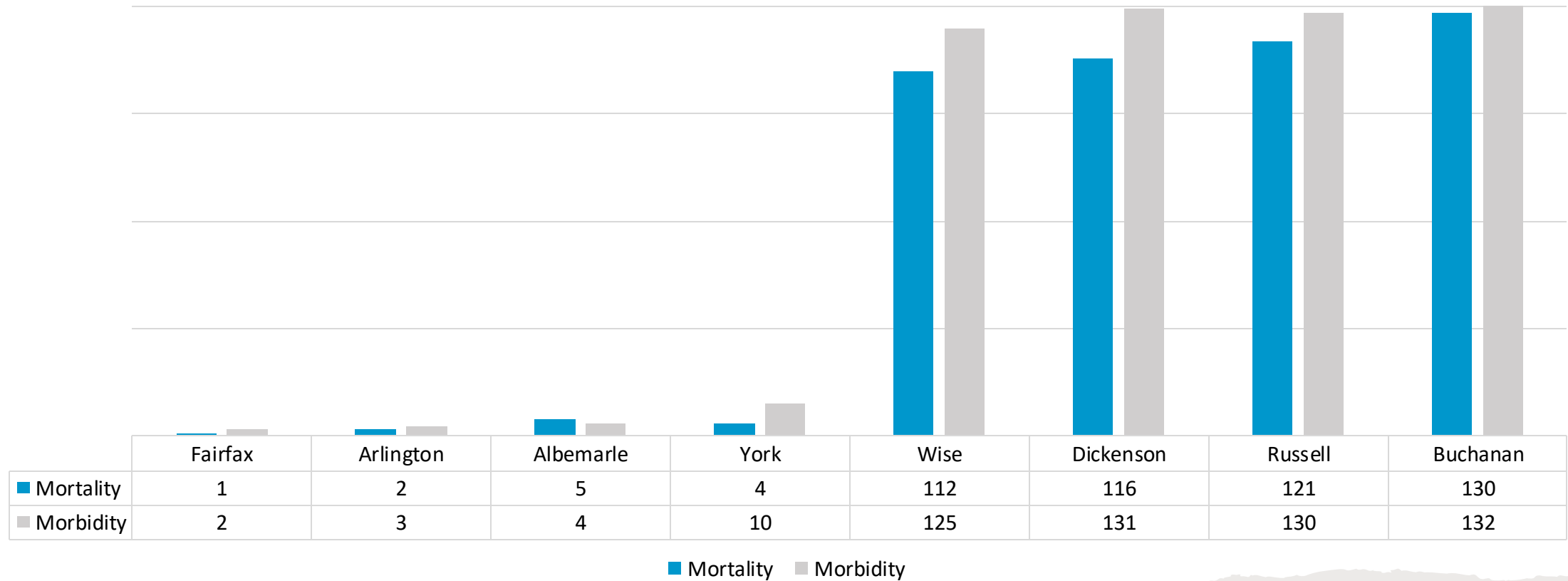
- 42% more likely to die from heart disease
- 46% more likely to die from chronic obstructive pulmonary disease
- 47% more likely to die from pneumonia or influenza
- 65% more likely to die from diabetes
- 62% more likely to die from chronic liver disease
- 61% more likely to die from unintentional injuries and
- 30% more likely to commit suicide

Source: *Virginia Health Statistics. Averages based on age-adjusted death rates for 2013.*



# Health Outcome Rank

*County Comparison Across Virginia*



- Acute Disease Management
- Behavioral Health Clinics
- Cardiovascular Clinics
- Chronic Disease Management
- Colorectal Cancer Screenings
- Colposcopy Health Clinics
- Community and Group Lifestyle Coaching Classes
- COVID-19 Testing and Vaccine Clinics
- Cystoscopies
- Dental and Dentures
- Dermatology Health Clinics
- Diabetic Education / Diabetes Prevention Program
- Diabetic Retinopathy Screenings
- Ear, Nose and Throat Clinics
- Echocardiogram Clinics

- Endocrinology Health Clinics
- Eye Exams and Eyeglasses
- Hearing Aid Assistance
- Hepatitis C Clinics
- Influenza Vaccines
- Lab and Diagnostic Services
- Medical Therapy Management
- Medicare and Medicaid Enrollment
- Medication Assistance and Pharmacy Connect
- Mental Health Screenings
- Nephrology Specialty Clinics
- Ostomy Clinics
- Pastoral Care
- Physical Assessments
- Plastic Surgery Clinics
- Pneumococcal Vaccines

- Podiatry Health Clinics
- Pre and Post Op Surgery Clinics
- Psychiatry Health Clinics
- Psychological Counseling
- Pulmonary Health Clinics
- Referral and Follow-Up Systems
- Sports Physicals
- Skin Cancer Screenings
- Substance Use Disorder Counseling
- Telemedicine Clinics
- Transportation Assistance
- Ultrasound Clinics
- Urology Clinics
- Vision
- Women's Health Clinics
- Wound Care Clinics
- X-Ray Clinics

# Components of the Health Care Outreach

# 2021 Care Recap

- 34,630 Patient Encounters
- 11,630 Unduplicated Patients
- Value of Care (\$153/visit) – \$5,298,390
- Pharmacy Connect Value of Medications – \$806,352.40
- Medicaid Enrollment – 247
- FAMIS Enrollment – 130
- Dental Clinic – 1,975
- Vision Clinic – Iris, can you add from annual report?
- COVID Testing – 14,889
- COVID Vaccines – 3,787
- COVID MABS – 3,700



# SMIDDY CLINIC

5626 Patriot Drive

Wise, Virginia

- X-Ray / Ultrasound Suite
- Dental Suite
- Procedure Room
- Telemedicine Room (6 Amwell Carts)
- Lab
- Pharmacy
- Support Spaces





**Sister Bernie M.M.M. Clinic**  
**927 Happy Valley Drive, Clintwood, VA 24228**  
**Built in 2020 with an Appalachian Regional Commission Grant (ARC)**  
**and Donations from Individuals and Foundations**

# M7

## Move Mountains Medical Missions

Largest Medical Outreach of its Kind in the Nation

- In addition to the Health Wagon's stationary clinics and regular mobile sites, the Health Wagon staff spearheads the annual M7 (formerly Wise County Remote Area Medical (RAM) Expedition).
- FREE three-day summer event held annually at the Wise County Fairgrounds
- Volunteer physicians, nurse practitioners, dentists, nurses, opticians, ophthalmologists, dental hygienists, specialists, etc.



# M7

## SEVEN CORE HEALTH CARE INITIATIVES (M7)

1. Eye -  
Comprehensive  
Exam,  
Prescription  
Glasses, Retinal  
Camera and  
Pediavision

2. Dental -  
Cleanings,  
Filings,  
Extractions and  
Dentures

3. Medical -  
Primary Care,  
Specialty Care,  
Preventive  
Care, and  
Telehealth

4. Advanced  
Diagnostics &  
Lab Services -  
Colposcopy &  
LEEP,  
Cystoscopy, X-  
Ray,  
Ultrasound,  
Echocardiogra  
ms, Pulmonary  
Function  
Testing, and  
Bone Density

5. Veterinary  
Services - Spay,  
Neuter and  
Vaccinations

6. Social -  
Resource Fair,  
Food  
Insecurity,  
Hygiene Items,  
Community  
Linages,  
Insurance  
Enrollment

7. Spiritual,  
Faith-Based,  
Pastoral Care

# M7 An Aerial View

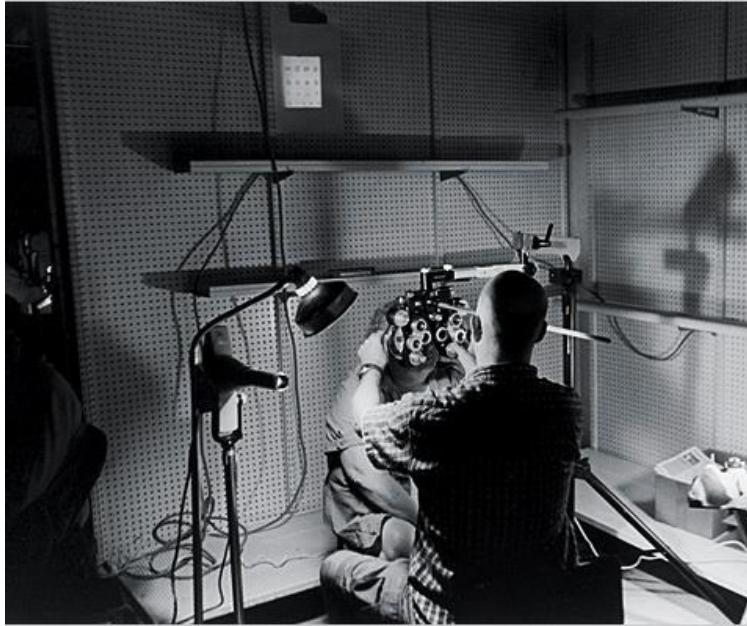




# The New York Times Visits Clinic in 2016



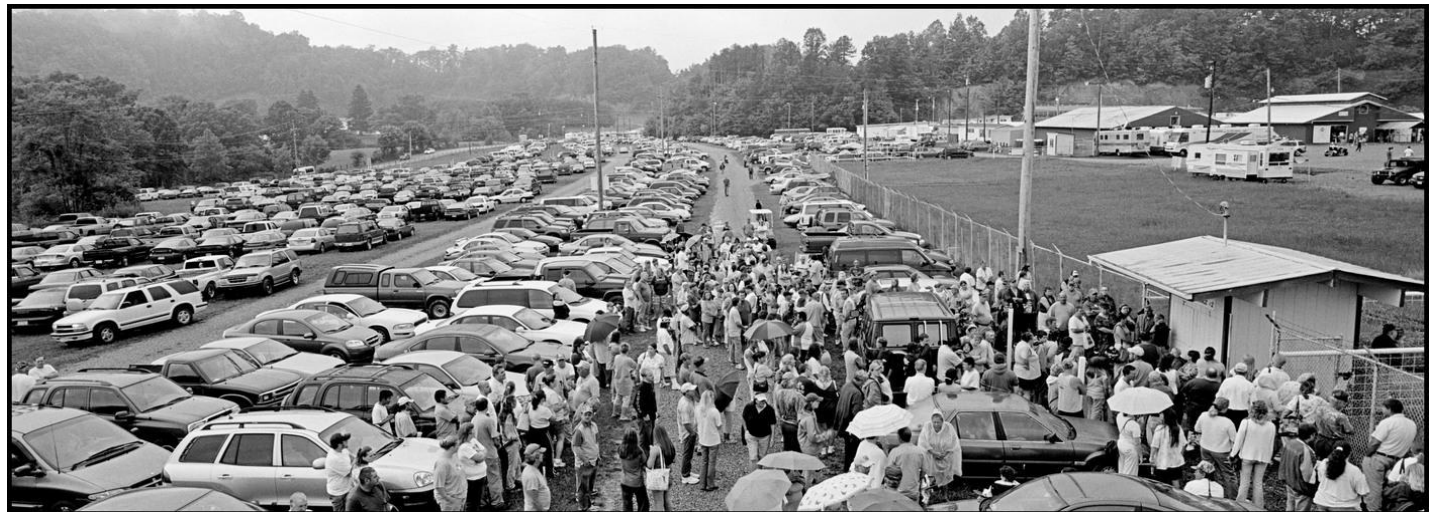
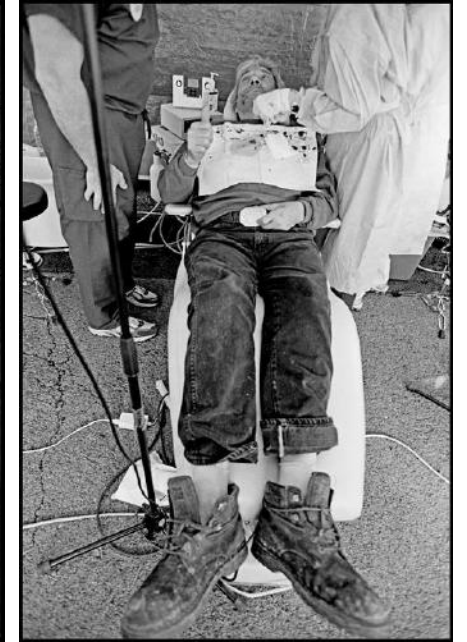
**Snapshot  
of M7**



# M7 Photos by Larry Towell

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M7 Photos by  
Larry Towell –  
A Famous War  
Photographer





# The Health Wagon Featured on 60 Minutes

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**2017 and 2019 Department of Defense Funded Innovative Readiness Training Events (IRT)**



**2017 and 2019  
Innovative Readiness  
Training Event**





## Innovative Readiness Training (IRT)

- No Cost Eye, Medical, Dental, Veterinarian Services
- 2017
  - Medical - 305
  - Vision – 927
  - Dental - 459
  - Vet – 1,759
- 2019
  - Medical – 1,920
  - Vision – 2,154
  - Dental – 2,398
  - Vet – 1,228



# Media Coverage

Bringing Awareness and Access to Rural Central Appalachia



- CBS 60 Minutes
- CBS Nightly News
- CBS This Morning
- Inside Edition
- New York Times
- Nightline
- Richmond Times Dispatch
- Swiss Broadcasting
- Tamron Hall Show
- Virginia Business
- Wall Street Journal
- Washington Post
- Washington Examiner

# Innovation

The Health Wagon is at the forefront of innovation. The Health Wagon is a leader in health care innovation, through use of mobile health units, drone delivery of medication, and telehealth services.





# 1<sup>st</sup> FAA Approved Drone Delivery in the United States

# Partners in Telehealth

- Utilizes an advanced computer system and broadband telecommunications that provides specialty services to patients
- Allows patients in secluded rural areas to go to local facilities, increases convenience and lowers cost of care
- The Health Wagon is the highest utilizer of telehealth services in the Commonwealth of Virginia



# Benefits of Telehealth



## Patients

Timely access to locally unavailable services  
Improves chronic disease management  
Reduces the burden and cost of transportation for care  
Vulnerable populations often face geographic barriers to care



## Health Professionals

Access to consultative services  
Supports team based, collaborative care delivery models  
Access to providers: we are in a health professional shortage area



## Hospital Systems

Facilitates appropriate transfers, keeps patients local when appropriate  
Decreases readmissions through remote patient monitoring tools



## Communities

Enhances partners  
Supports local workforce

# Health Wagon Telehealth Models

- Screening for Diabetic Retinopathy
- Endocrinology
- Dermatology
- Psychiatry / Counseling
- Cystoscopies
- Colposcopies
- Cardiology / Echocardiograms
- Radiology
- Wound Care
- Pain Management (non opioid)
- Medication-Assisted Treatment
- Hepatic Consults / FibroScans
- Project Echo
- Other Specialties



# Health Wagon Artificial Intelligence

- Amwell Carts
- EKO Stethoscope
- Mobile ODT Colposcope
- Data/Analytics
- Telecystoscopies (1<sup>st</sup> in the world to do in partnership with UVA)
- Upcoming Point of Care Ultrasound
- 3-D Printing of Dentures





First Telecystoscopies in the **World**

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# Clinical Partnerships

The Health Wagon and U.S. Surgeon General Respond to Opioid Crisis • Responding with Love and Compassion



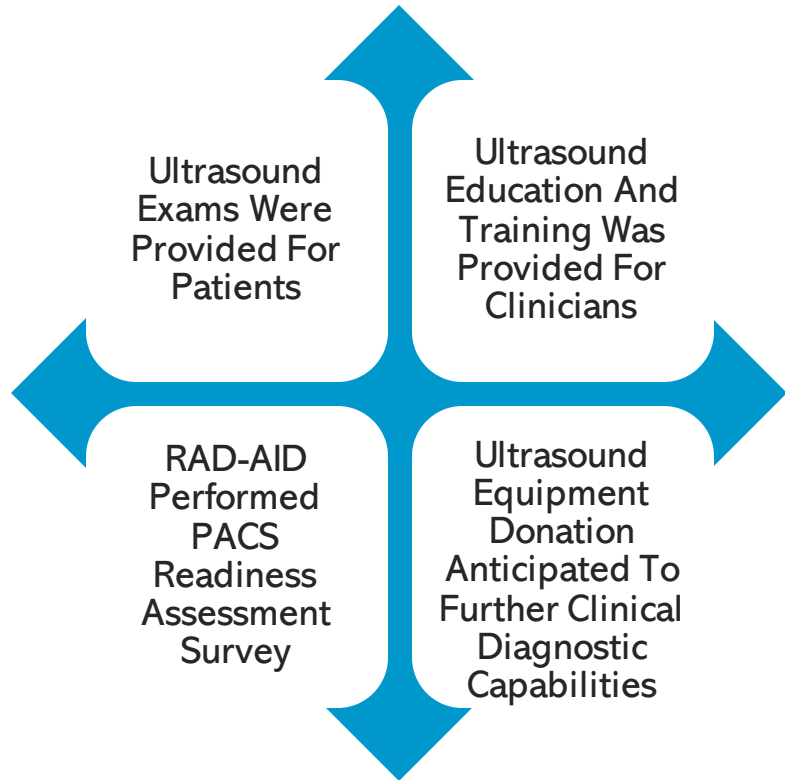
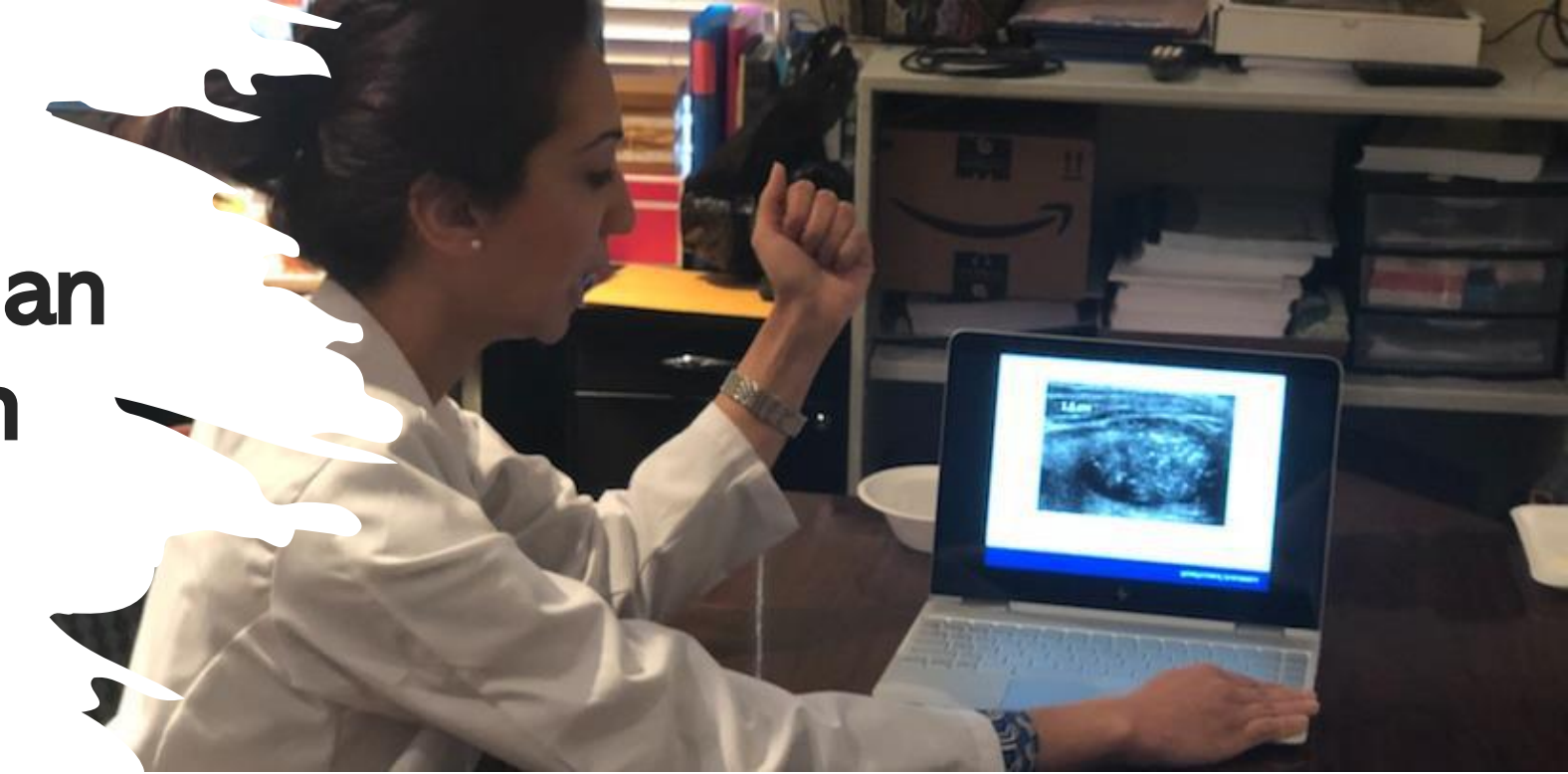
# Partner Focus – Health Resources & Services Administration

# HRSA

Health Resources & Services Administration

- Tens of millions of Americans receive quality, affordable health care and other services through HRSA's 90-plus programs and more than 3,000 grantees.
- The Health Resources and Services Administration (HRSA), an agency of the U.S. Department of Health and Human Services, is the primary federal agency for improving health care to people who are geographically isolated, economically or medically vulnerable.
- HRSA programs help those in need of high-quality primary health care, people living with HIV/AIDS, pregnant women, and mothers. HRSA also supports the training of health professionals, the distribution of providers to areas where they are needed most and improvements in health care delivery.

# Partner Focus – RAD AID Appalachian Radiology Outreach





# Partner Focus – RWJ Barnabas Health





UNITED HEALTH FOUNDATION®

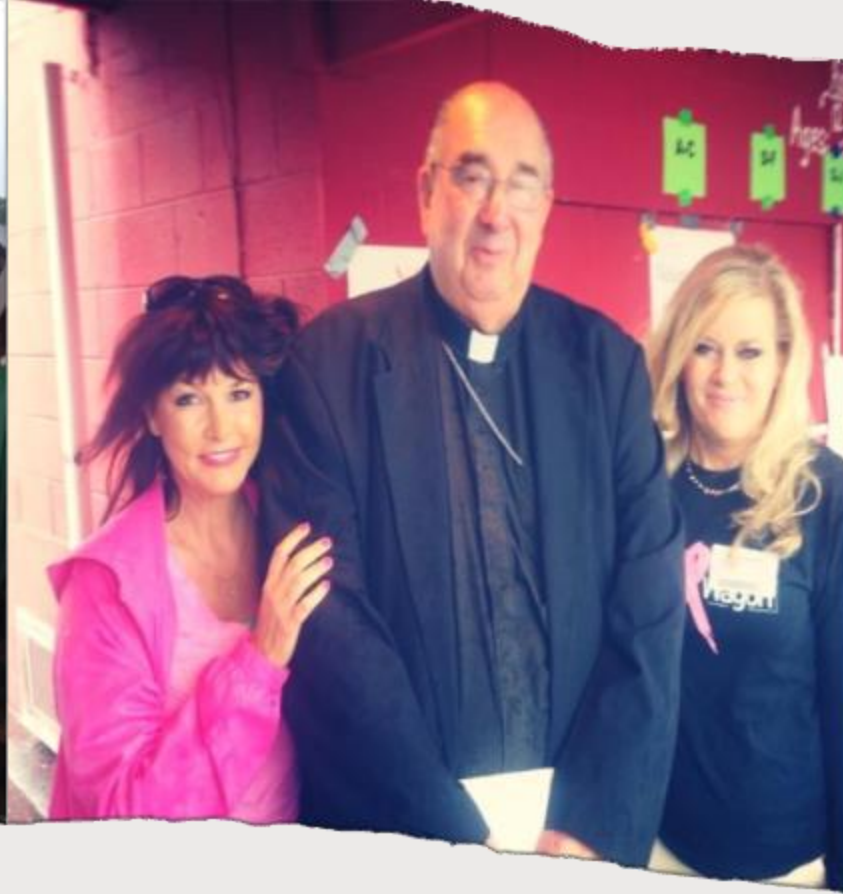


Philips  
Foundation



## Partner Focus – United Health Foundation and Philips Foundation

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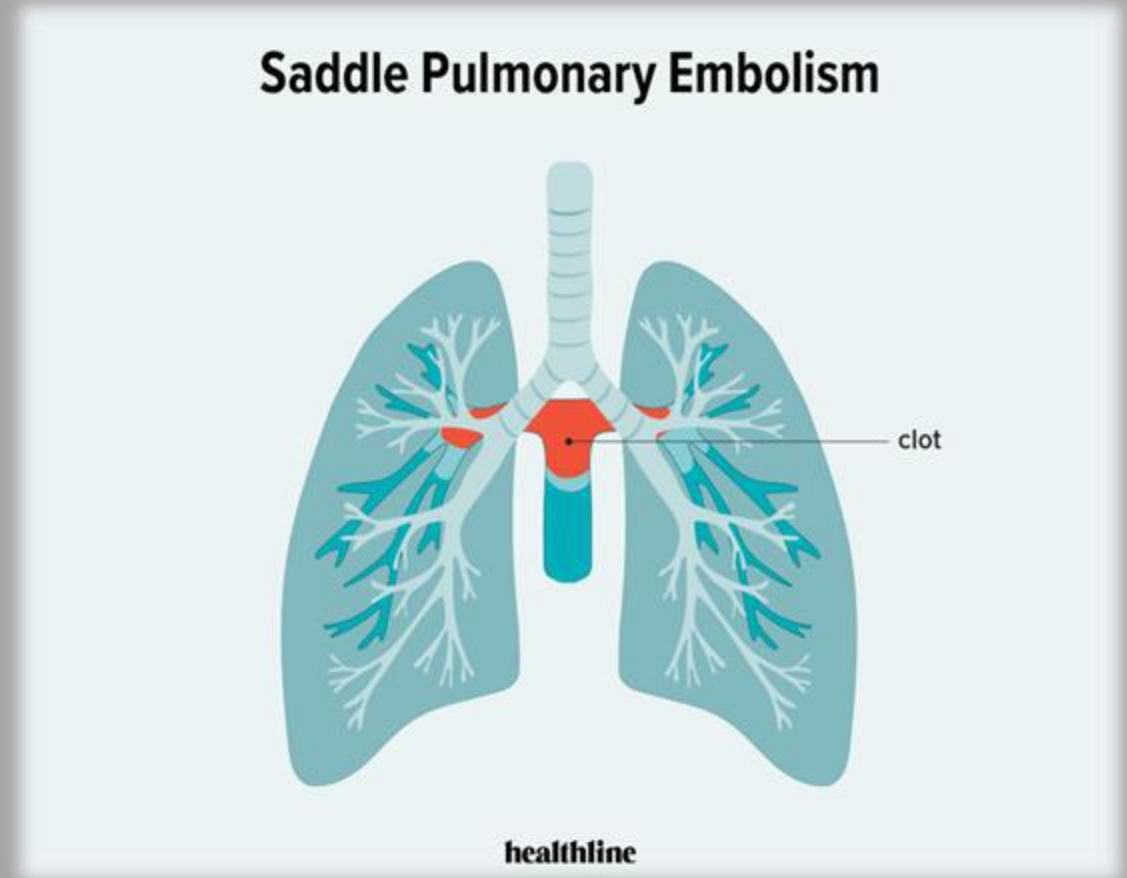


**Beloved Bishop DiLorenzo Visits,  
2015** “Inequality is the root of social ills”

# 2021 – One of the Most Difficult Years Due to COVID-19

- Implemented a robust telehealth strategy through DOXY.me for both Medical and Dental services
- Divided the workforce into three separate teams to prevent cross contamination
- Implemented employee and patient screening
- Integrated Ring Doorbells for patient contactless screening
- Implemented a telework strategy when possible, to reduce in person contact
- Introduced contactless temperature screening for staff and patients for entry into the building
- Introduced new construction into the static clinic sites to alter air flow and create negative pressure exam rooms

# 2020 – One of the Most Difficult Years Due to COVID-19



# Post COVID-19 Clinics

- Immediately began a plea for COVID vaccinations
- Virginia Department of Health provided COVID vaccinations
- Began Post COVID Clinics that included walk testing, chest x-rays, pulmonary function testing, BNP, D-Dimer, Troponin, CRP, BMP, TSH, CBC
- Began vaccinating individuals at clinics, at local businesses and through drive-thru clinics



INASMUCH AS YE HAVE  
DONE IT UNTO ONE OF  
THE LEAST OF THESE MY  
BRETHREN, YE HAVE DONE  
IT UNTO ME.  
MATTHEW 25:40

# Moral Imperative

- Liberty and Justice for all... includes concept of health care
- Don't stand idly by in your brother's blood (Leviticus 19:16)
- Sr. Bernie responded to social injustice over forty years ago

# Respond With Love

- Respond as Sr. Bernie did with an act of love
- Volunteer
  - Medical (Physicians, Specialists, NPs, PAs, Nurses, Scribes, any and all...)
  - Non-Medical (General Support, Business/Clerical)
- Contribute hours as a group
- Donate gifts in-kind from our wish list
- Participate in a fundraising event
- Invite us to speak
- Schedule a tour of the Health Wagon
- Tell someone about the Health Wagon
- Make a financial donation
- Like us on social media
- Involve students inter-professionally
- Pray for the mission

**Donate  
Today  
Your Gift  
Saves Lives**

[www.thehealthwagon.org/donate](http://www.thehealthwagon.org/donate)



[www.healthwagon.org](http://www.healthwagon.org)

**TEXT 41444 TO  
DONATE  
TO OUR CAUSE**

**To Donate \$10.00**  
Text WAGON10 to 41444

**To Donate \$25.00**  
Text WAGON to 41444

**To Donate over \$25.00**  
Text WAGON  
(insert amount) to 41444

# Contact Us

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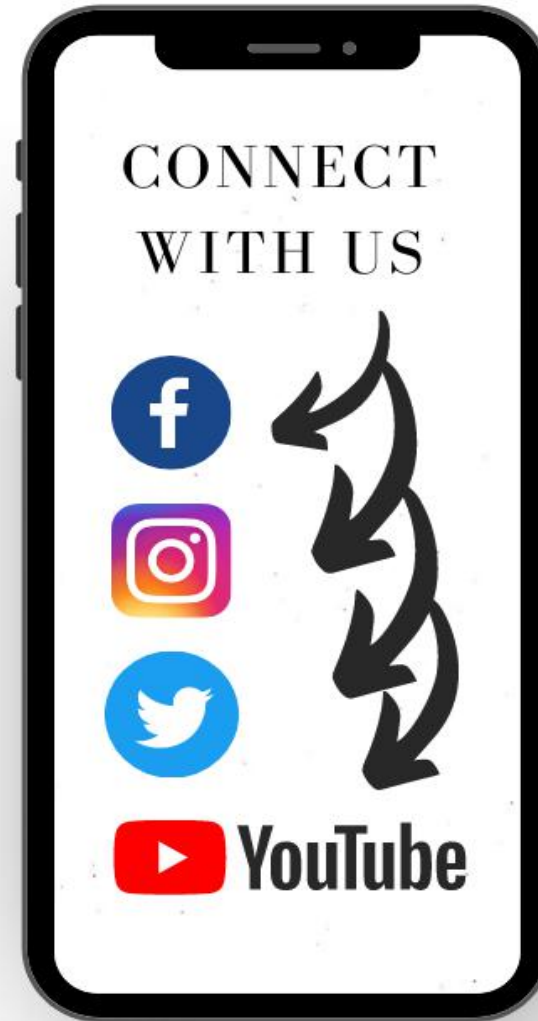
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“The Health Wagon”