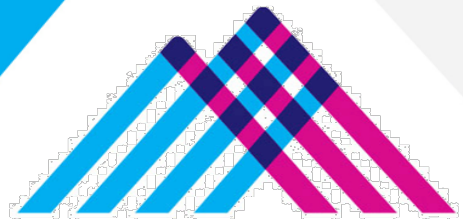
Hospitalization at Home:
Mount Sinai Health System Experience
(New York, NY)

December 2020

Linda V. DeCherrie, MD



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Conflicts

No conflicts of interest

Dr. DeCherrie is a full time employee of the Icahn School of Medicine, which in turn has an ownership interest in a joint venture with Contessa Health, a venture that manages acute care services provided to patients in their homes through prospective bundled payment arrangements. Dr. DeCherrie has no personal financial interest in the joint venture.

Mount Sinai Health System's History

2014
Mount Sinai received Center for Medicare & Medicaid Innovation award to create Hospitalization at Home. Received funding from The John A. Hartford Foundation.

2017
Building on initial award phase success serving over 700 patients, Mount Sinai & Contessa form a joint venture to increase patient access to our clinical models.

2020
Mount Sinai Hospitalization at Home admits patients from 4 Mount Sinai hospitals including Mount Sinai Hospital.

Hospitalization at Home Prior to new CMS waiver

Mount Sinai's Hospital at Home – Plus

Admission

- Eligibility and home situation reviewed
- Services organized
- Transport home

Acute Care

- 3-5 days
- Daily MD & nursing visits
- IV medications, oxygen, x-ray, lab tests
- 24/7 support
- Discharge

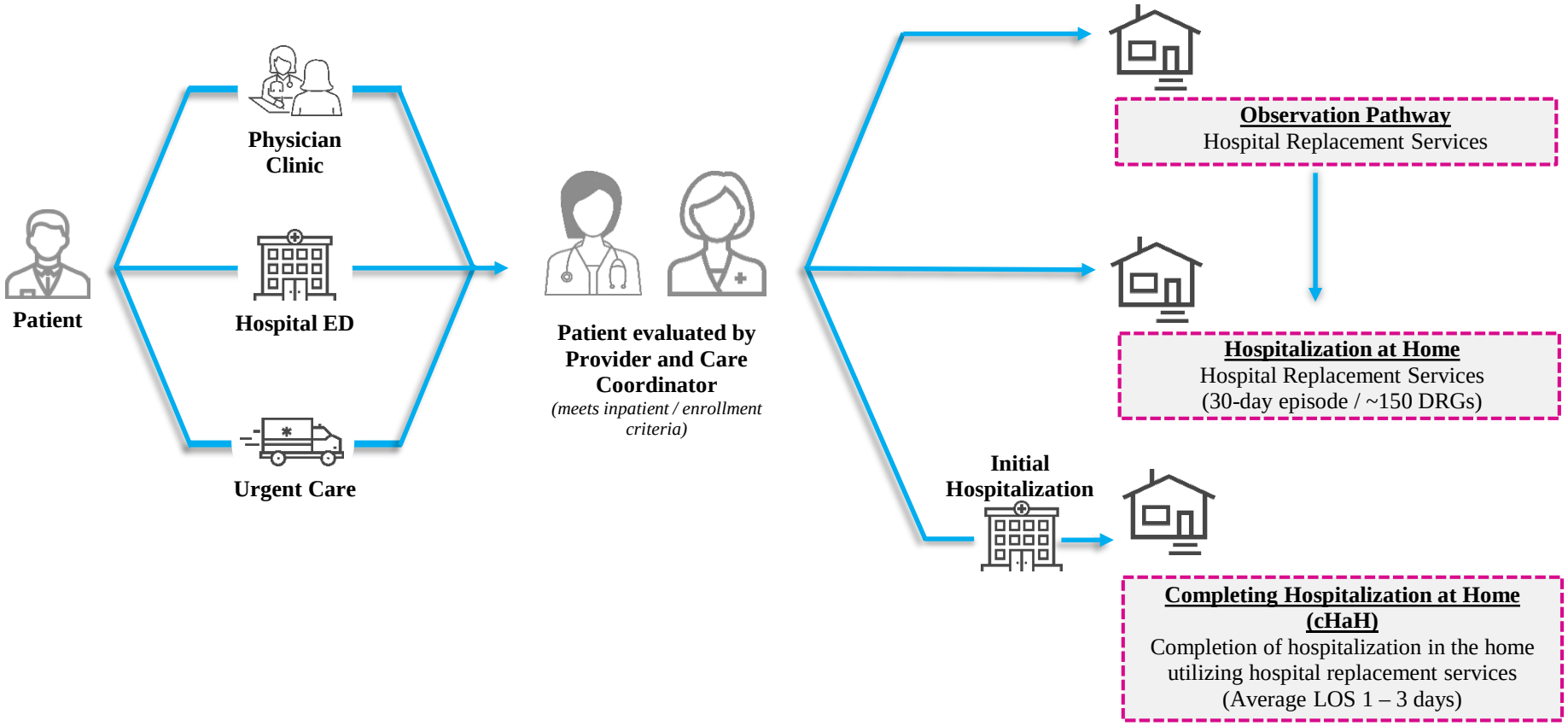
Post-acute

- Services available for 30 days
- Follow-up visits by team
- Intensive disease specific care management

The Hospitalization at Home Model Addresses the Immediate Concerns Around Hospital Capacity

The Hospitalization at Home (HaH) model delivers all the essential elements of inpatient care in the safety and comfort of a patient's home

CLINICAL MODEL

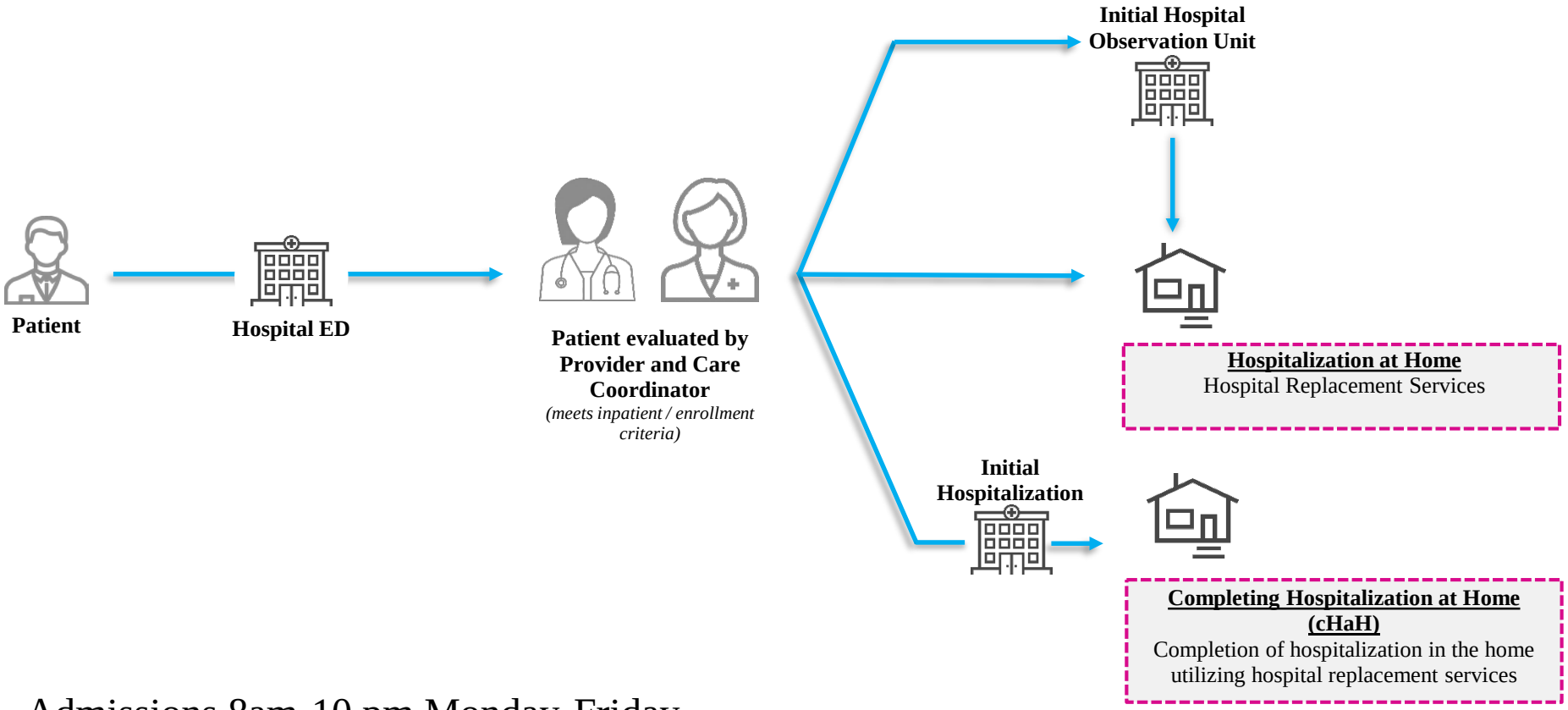


Hospitalization at Home Under new CMS Waiver

Admissions

The Hospitalization at Home Model Under CMS Waiver

CLINICAL MODEL



Admissions 8am-10 pm Monday-Friday

Extensive Focus on Clinical Protocol Development

HAH

COPD

CHF

Pneumonia

UTI

Cellulitis

DVT / PE

Asthma

Dehydration

General Medicine Protocol for any patient that could be safely treated at home

Includes 44 episodes & 151 DRGs

Top DRGs Treated in HaH

Pneumonia	16%
Cellulitis	14%
CHF	13%
COPD	10%
UTI	10%
DVT/PE	5%
Asthma	5%
Gastro	4%
Renal Failure	2%
Other	21%

Hospital at Home Capabilities

What treatment modalities can be used in the home?

- Labs
- Imaging
- Arranging visits with consulting specialists
- Supplemental oxygen up to 4 liters per NC*
- Established CPAP/BiPAP patients
- Respiratory treatments
- IV diuretics
- IV antibiotics (continuous and intermittent)
- Continuous IV fluids
- (PD/HD patients with established treatment plan)
- Wound vacs
- Intermittent catheterizations
- Chest tubes to gravity

What treatment modalities can't be used in the home?

- Oxygen requirements greater than 4 liters per NC*
- New orders for CPAP/BiPAP
- Cardiac drips
- Heparin/insulin drips
- Blood transfusions
- Continuous cardiac telemetry monitoring
- Continuous pulse oximetry
- Continuous bladder irrigation
- NGT to suction
- Frequent neuro checks
- IVP/IM narcotics

*Patients with baseline oxygen use above 4L can be considered for HaH admission based on their clinical presentation including past medical history

A patient could receive treatment in the ED or Observation prior to transitioning to Hospital at Home

Example Specific Exclusion Criteria

Diagnosis #1: Congestive Heart Failure (CHF) Exclusion criteria in HAH	
1. Associate with hemodynamic instability	Exclude patients with hemodynamic instability including severe arrhythmias, symptomatic bradycardia/tachycardia, HR <40 and HR > 120
2. Associated with known or suspected severe valvular disease of aortic or mitral valve	Exclude patients if CHF associated with aortic stenosis with valve area known to be in critical range or associated with gradient >40mm or severe mitral stenosis. ECHO need not be obtained solely to screen for severe valvular disease to excluded patient from HAH care if clinical suspicion is low.
3. Suspected pulmonary embolism and a CHF exacerbation at the same time	Exclude patient if he/she is suspected of having a PE and the diagnosis of PE cannot be excluded before admission

* Not complete inclusion/exclusion criteria for CHF diagnosis

Covid-19 admissions

Mostly admitting patients for our cHaH pathways, where patient is first in hospital for a few nights and has demonstrated improvement but still requires hospitalization.

Inclusion	Exclusion
If no respiratory symptoms can admit from ED if meets criteria for other presenting symptom	Clinical trial participant
If respiratory symptoms, day 6+ post-onset Covid symptoms (may have been home prior to ED for a # of days)	Requires aide services
Stable/improving (O2 requirements stable/down trending, clinical trajectory stable/improving)	Ambulates with assistance from another person (can use an assistive device but uses independently)
If still febrile, other sources of infection have been ruled out	
If requires O2: >12 hours maintaining SpO2 >/= 92% on no more than 4L NC and >/=88% on 4L with ambulation	

* Not complete inclusion/exclusion criteria for Covid-19 diagnosis

Components

Mount Sinai/Contessa	External Vendors
MD, NP	Home Health RN, PT, OT, ST
SW	Infusion Pharmacy
ED care coordinators (RN)	DME company (Oxygen and equipment)
Virtual care coordinators (RN)	X-ray/Ultrasound company
Pharmacy – oral and injectable	Courier for food
Inpatient lab	Ambulance company
Community Paramedics	Telehealth (scale, pulse ox and BP cuff)
	Medical courier service

Ongoing care

Example day after admission schedule

8:00 am	Phlebotomist
8:45 am	Flip card rounds (not with patient): MD, NP, SW, RN, Care coordinator
9:00 am	RN visit
10:30 am	NP visit
12:00 pm	Delivery (DME, infusion, food)
2:00 pm	SW call
4:00 pm	Flip card rounds (not with patient): MD, NP, SW, RN, Care coordinator
7:00 pm	RN visit

Patient has telehealth kit and 24/7 access to care team

Electronic Medical Record

EMR – EPIC at Sinai

- 2014 - Outpatient EPIC
- 2018 - Outpatient EPIC with Therapy plans for active order set
- 2020 - Inpatient EPIC with certain functionality turned off (dietary, pharmacy, labs etc.)
- RNs from home care agency not on same EMR but we have developed work around

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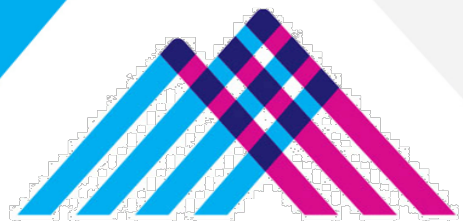
https://www.mountsinai.org/HAH



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BRIGHAM HEALTH
BWH BRIGHAM AND WOMEN'S HOSPITAL

David M Levine, MD MPH MA
Brigham Health
Harvard Medical School

HOMEHOSPITAL

Hospital-Level Care at Home for Acutely Ill Adults

Disclosures

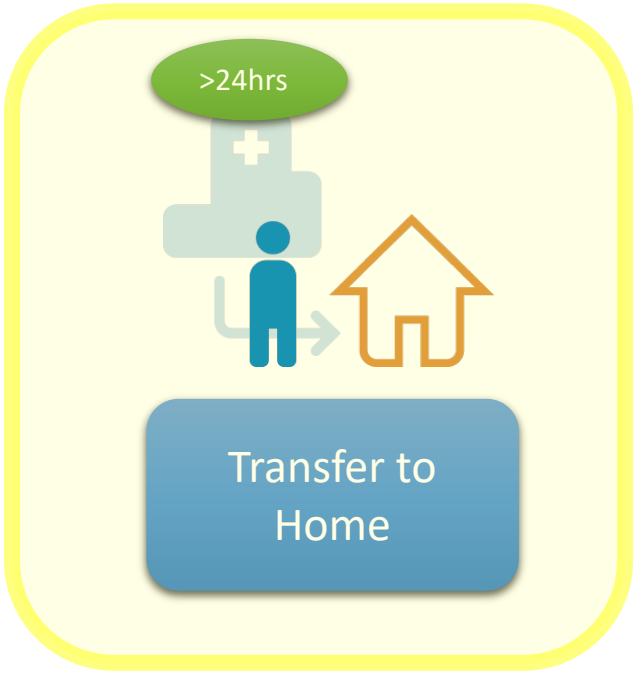
Biofourmis: PI-initiated study and co-development of software

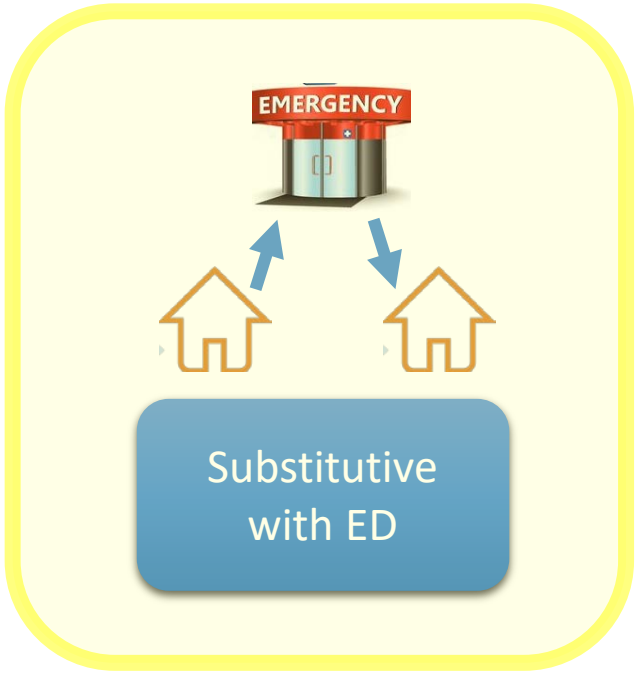
IBM: PI-initiated COVID-19 study

Need for Home Hospital

Bringing the Hospital Home

Home based provision of services usually provided in the acute inpatient setting.





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Leff B. Defining and disseminating the hospital-at-home model. CMAJ 2009;180(2):156-7.

Brigham Timeline

Hospital-Level Care at Home for Acutely Ill Adults: a Pilot Randomized Controlled Trial

RCT

2016
Pilot randomized controlled trial

RCT

2017-2018
Largest randomized controlled trial

1-arm

2018
Single arm innovation service

2019
Studies within home hospital

2020
New tech, diagnoses, and care models

Flow

Admit to Hospital

Decision to Admit

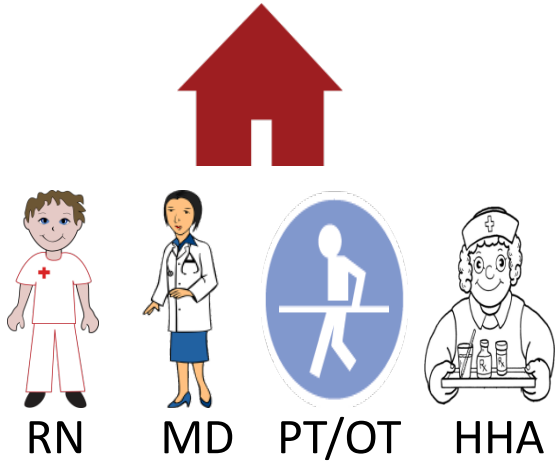
Meets Home Hospital Criteria and Agrees to Enroll

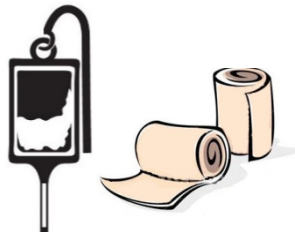
No

Yes

Decision to Discharge

Note the decision-making and process of the ED team is unchanged.

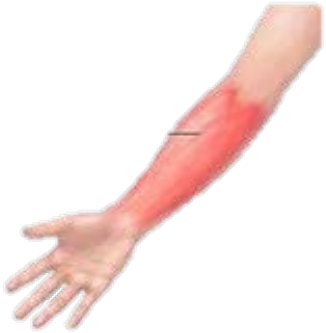




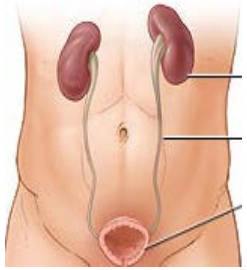
Treatment

Home Hospital Module Deploys

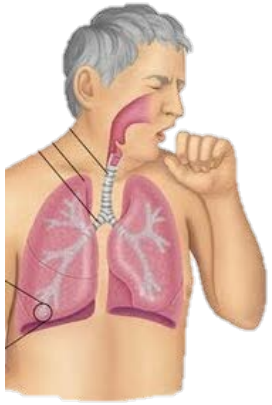
Conditions



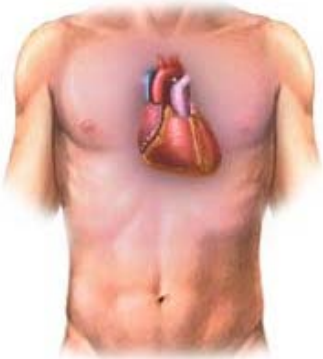
Cellulitis



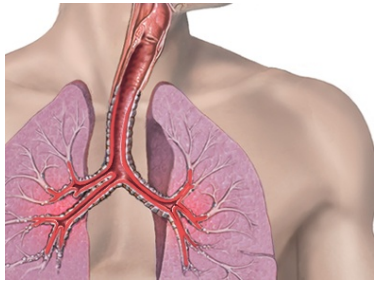
Complicated UTI



Pneumonia



Heart Failure



Asthma COPD

AF w RVR

DM + Complications

Anticoagulation Needs

Gout Flare

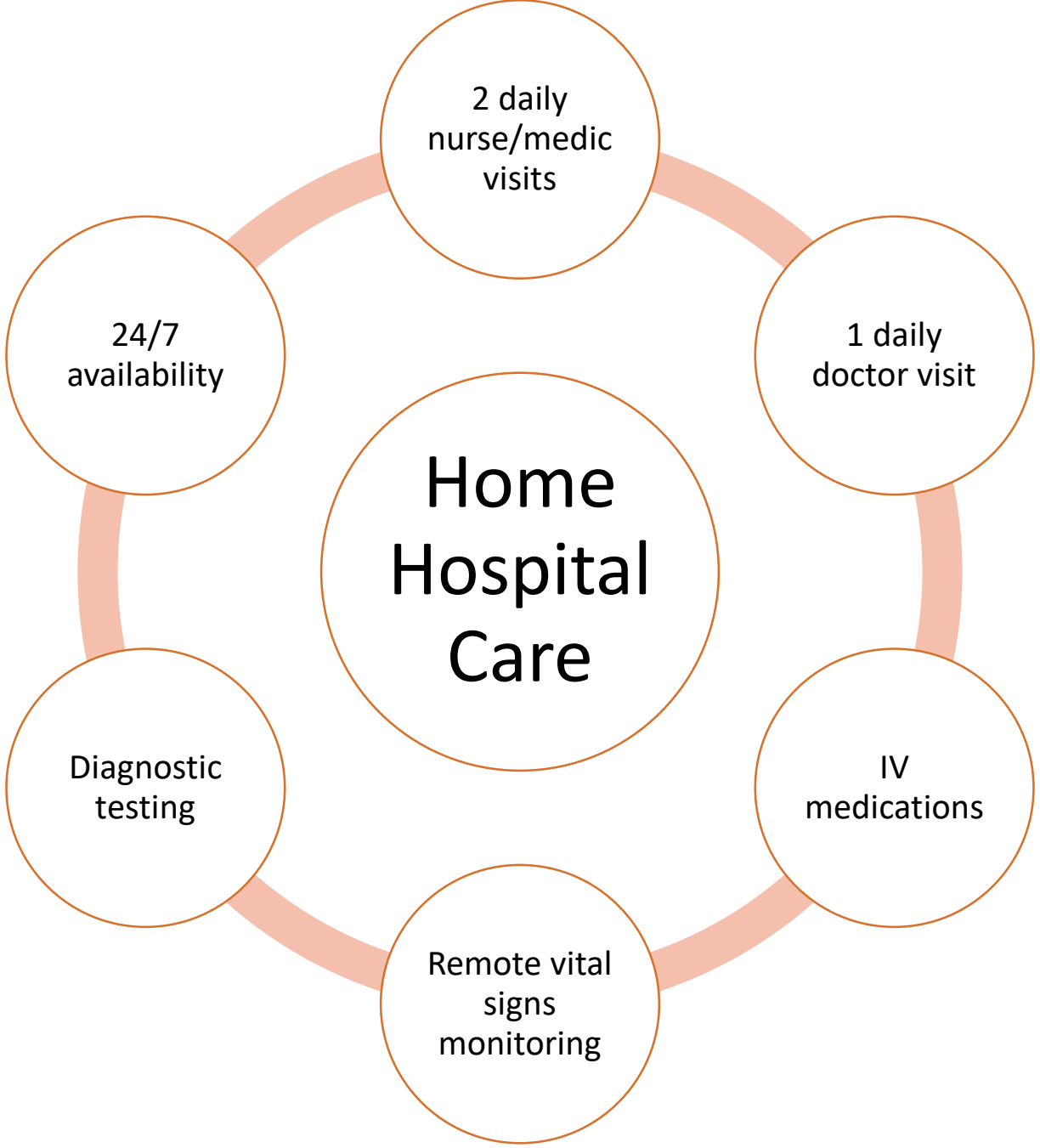
CKD w volume overload

HTN Urgency

Desires only Medical Management

Inclusion/exclusion for protocols published and open source

Levine DM. Annals of Internal Medicine. 2020.



If needed: specialist consultation, home health aide, physical therapy, social work, food delivery

Build vs Buy

Infusion

Pharmacy

Monitoring

Software

DME

Personnel

Diagnostics

Food

Stuff You Need – MVP

Mantra: build for what you need and need what you build

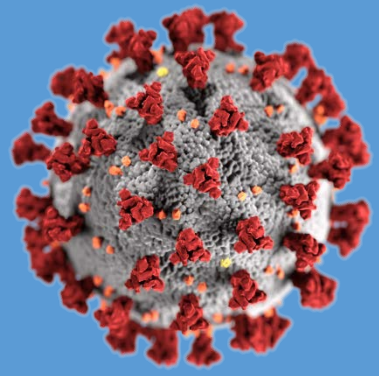
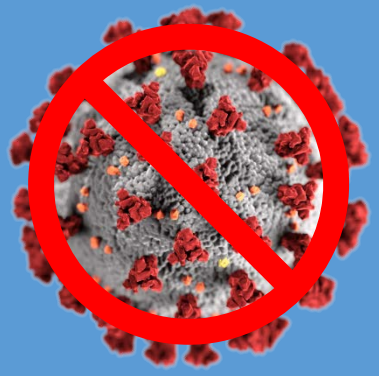
- Oxygen concentrator
- Infusion gadget: pump vs elastomeric ball
- Monitoring gadgets: continuous vs intermittent
- Commode
- Scale
- Encrypted video, audio, text

People You Need – MVP

Mantra: use your hospital wherever you can

- Physician
- Nurse
- Program associate
- +/- PT, OT, SLP, SW
- +/- APP
- +/- mobile integrated health paramedic
- +/- home health aide

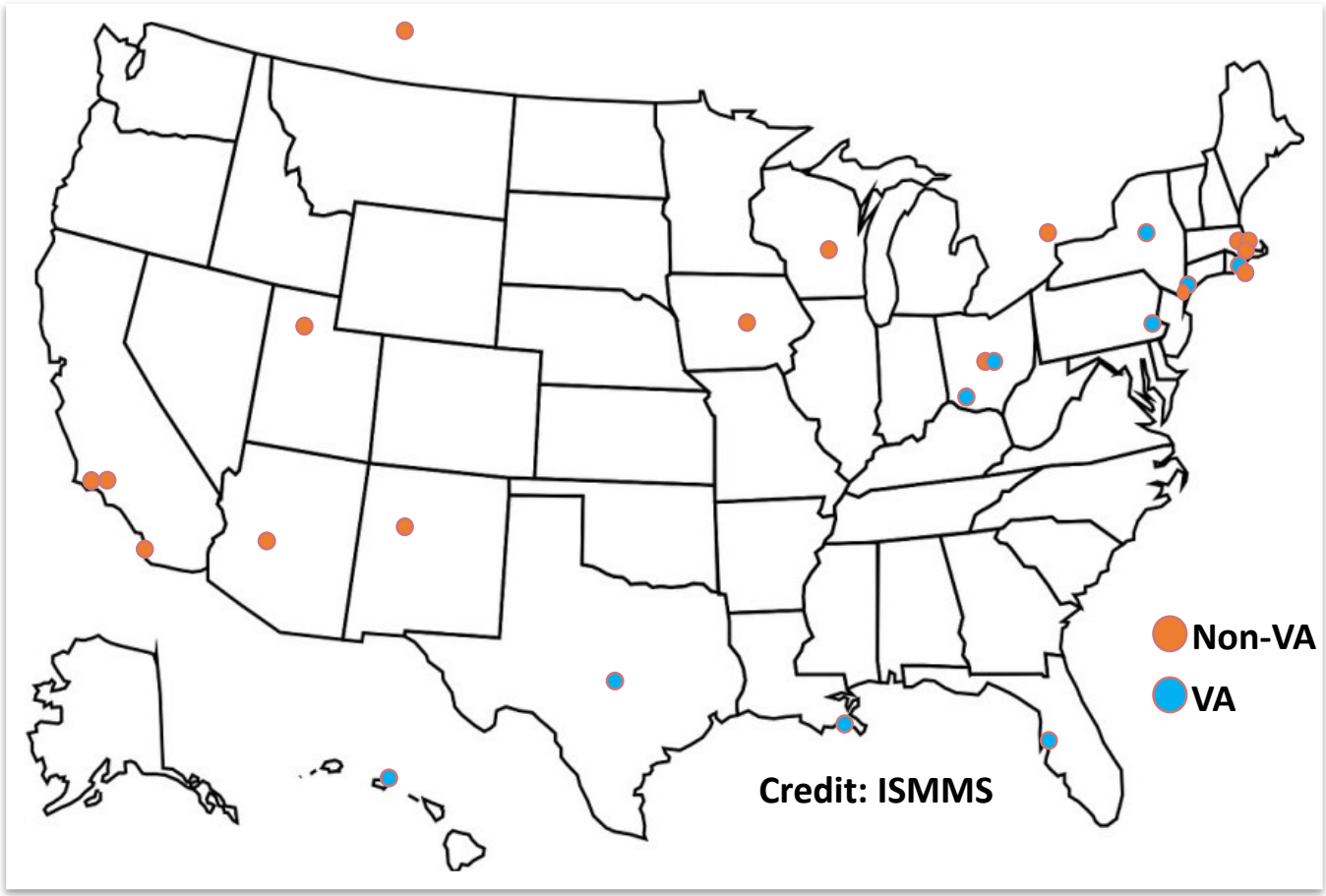
COVID-19 Adaptations

Consideration		
Volume	Low volume of non-COVID diagnoses	Sufficient volume of non-COVID diagnoses
PPE	Sufficient	Insufficient
Staff	Deep bench	Small specialized bench
Pulse oximetry	Yes	No
Oxygen	Yes	No

Users Group

Hospital AT Home
USERS GROUP

- 25+ programs
- Developed
  - Practice standards
  - Quality measures
  - Regulatory framework
- Research
- Advocacy



hahusersgroup.org

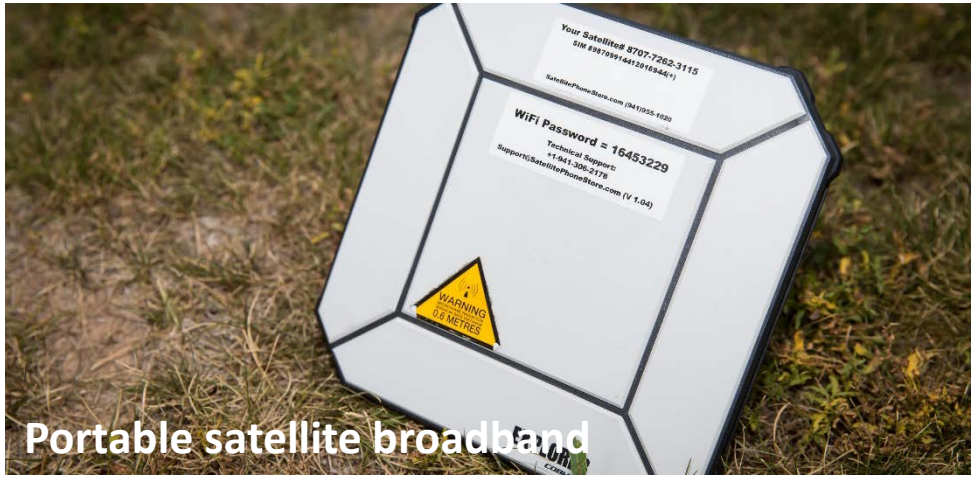
World Hospital at Home Congress

We piloted a prototype rural home hospital model using mock admission in September 2019

Pilot components at rural home hospital site – Vernal, Utah

Portable ultrasound with real-time delivery

Treatment, counseling & education through remote physician



Portable satellite broadband

In-person paramedic presence

“

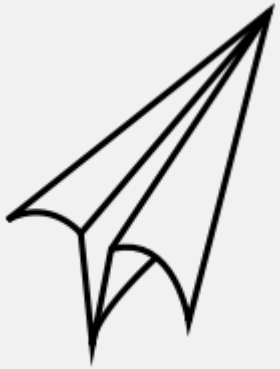
We have focused on **break-through** innovations without a matching investment in **follow-through** innovations.

-Atul Gawande

Design Methodology 101

Phase 1

It might work



Interest

Phase 2

It does work

Measurable Outcome

Phase 3

How we work

Impact

Credit: David Asch, MD MBA

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