

Congestive Heart Failure

ACUTE CARE PATHWAY

OBJECTIVE

Enable physiologic monitoring and geographically-distributed care coordination to ensure effective acute care for patients with a CHF exacerbation

DURATION

**2-10
DAYS**

ELIGIBILITY

- Patient with clinical or diagnostic evidence of exacerbation requiring IV diuresis.
- Exclusion criteria
 - GWTG-HF Risk score >10% in-hospital mortality. Class IV/ Stage D; LVAD; ionotropic (acute) or vasopressor support; severe PH.
 - O₂ requirement >4L NC to maintain saturation >90%

PRIMARY OUTCOME MEASURES

PROMs

DISEASE-SPECIFIC

30 DAY

ED PRESENTATION

30 DAY

MORTALITY

30 DAY

READMISSION

PATIENT SATISFACTION SCORE

CARE PROTOCOL DETAILS

DEVICES

- Continuous telemetry (VitalConnect VitalPatch)*
- Connected weight scale (Welch Allyn RPM-SCALE100 or ForaCareW550)
- Connected BP cuff (Welch Allyn 1700, Omron BP7000)
- Connected pulse oximeter (Nonin 3230)

* denotes optional monitoring device based on severity of patient and clinician preference

DAILY MONITORING

- Review physiologic data
- Review subjective patient data (diary)
- Review patient task compliance

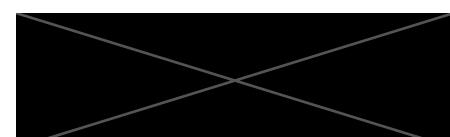
CARE COORDINATION

- Telemedicine/virtual visit platform
- Interdisciplinary task management system
- Phlebotomy, radiology, diuretic administration

ALERTS/THRESHOLDS/ESCALATIONS

- Immediate alerts sent to clinical team for aberrancies to clinician-defined, patient-specific thresholds:
 - Continuous/intermittent vital sign data
 - Arrhythmia detection
 - Fall detection*

Please refer to Appendix for suggested thresholds values and example escalation protocol



Congestive Heart Failure

POST-ACUTE CARE PATHWAY

OBJECTIVE

Reduce risk of hospital readmission, ER visits and premature mortality in CHF patients, while optimizing patient comfort. Our program targets patients transitioning to home, after a hospital stay for acute treatment of CHF

DURATION

30
DAYS

PRIMARY OUTCOME MEASURES

30 HOSPITAL RE-ADMISSION DAYS RATES

PATIENT SATISFACTION SCORE

30 90 06
DAYS DAYS MONTH
MORTALITY

G D M T
MEDICATION ADHERENCE

CARE PROTOCOL DETAILS

SYMPTOM TRIAGING QUESTIONNAIRES

- Daily Biofourmis HF symptom checker – assessment for symptoms of volume overload (SOB with activity at rest or lying down), chest pain, dizziness, functional status
- Monthly KCCQ12 (Kansas City Cardiomyopathy Questionnaire) and scoring
- Optional PHQ9 (depression survey) – at program initiation

PHYSIOLOGIC MONITORING (DEVICES)

- Everion armband - continuous monitoring of HR, RR, Spo2, skin temp and activity levels
- Connected weight scale (Welch Allyn RPM scale-100)
- Connected BP cuff (Welch Allyn 1700)

OTHER RECOMMENDED CARE

- Optional in-home ECG, as needed, per clinician recommendation
- FSBS q6hrs, if DM

APPENDIX

ELIGIBILITY

- Age – 21-75; Patient diagnosed with CHF and eligible for discharge and outpatient monitoring
- Improving congestion, off O2 and transitioning to oral diuretics
- Ability to complete tasks and questionnaires in-app (with languages offered) and use required devices
- Exclusion criteria: Class IV/ Stage D; LVAD; ionotropic or vasopressor support; severe PH; hypotension

COMPLICATIONS OR ADVERSE EVENTS

- Volume overload – Shortness of breath with activity or when lying down; persistent cough; swelling of lower extremities, belly, rapid weight gain
- Rapid or irregular heart beat
- Myocardial infarction / chest pain
- Progressive kidney damage and renal failure
- Uncontrolled medical comorbidities

DAILY TASKS

VITALS MEASUREMENTS; DIARY, LABS, WOUND CARE, IMAGING, ETC

- Twice daily weight
- Twice daily BP measurements
- Daily fluid and salt intake tracking
- Medication adherence tracking

PATIENT EDUCATION

- CHF education content via patient app

ALERTS/ESCALATIONS/CARE COORDINATION

- Daily care team monitoring of
 - Patient questionnaire responses, care plan adherence, alerts and physiologic parameters
 - Comorbidity monitoring and management (diabetes, HTN, COPD)
- Support and intervention via chat/video

Chronic Obstructive Pulmonary Disease

ACUTE CARE PATHWAY

OBJECTIVE

Enable physiologic monitoring and geographically-distributed care coordination to ensure effective care for patients with COPD exacerbation

DURATION

2-6
DAYS

ELIGIBILITY

- Patient with clinical or biometric/imaging evidence of COPD exacerbation requiring IV medications and/or increased oxygen therapy and/or hospital-level respiratory care.
- Exclusion criteria
 - BAP-65 Class IV or V, O₂ requirement >4L NC to maintain baseline sat, significant acidosis or hypercarbia on VBG/ABG requiring BiPAP

PRIMARY OUTCOME MEASURES

PROMs

DISEASE-SPECIFIC

30 DAY

ED PRESENTATION

30

DAY
MORTALITY

30

DAY
READMISSION

PATIENT SATISFACTION SCORE

CARE PROTOCOL DETAILS

DEVICES

- Everion armband* – continuous HR, RR, SpO₂, skin temperature, and activity
- Connected BP cuff (Welch Allyn 1700, Omron BP7000)
- Connected pulse oximeter (Nonin 3230) if not using Everion
- Oral thermometer if not using Everion

* denotes optional monitoring device based on severity of patient and clinician preference

DAILY MONITORING

- Review physiologic data
- Review subjective patient data (diary)
- Review patient task compliance

CARE COORDINATION

- Telemedicine/virtual visit platform
- Interdisciplinary task management system
- Phlebotomy, radiology, nebulizer, steroid and antibiotic administration PRN

ALERTS/THRESHOLDS/ESCALATIONS

- Immediate alerts sent to clinical team for aberrancies to clinician-defined, patient-specific thresholds:
 - Continuous/intermittent vital sign data

Please refer to Appendix for suggested thresholds values and example escalation protocol

Chronic Obstructive Pulmonary Disease

POST-ACUTE CARE PATHWAY

OBJECTIVE

Reduce risk of ED visits, hospital readmissions, and premature mortality, while optimizing patient comfort and long-term management of patients' with COPD.

Monitoring daily signs and symptoms such as SpO₂, Respiratory Rate, cough, wheezing and shortness of breath is key to properly managing Chronic Obstructive Pulmonary Disease (COPD) exacerbations. Our program targets patients transitioning to home after acute in-patient COPD treatment and continuously engages with and monitors patients for signs and symptoms of clinical deterioration after discharge

DURATION

30
DAYS

PRIMARY OUTCOME MEASURES

30 HOSPITAL
RE-ADMISSION
DAYS RATES

PATIENT
SATISFACTION
SCORE

30 DAYS 90 DAYS 06 MONTH
MORTALITY

ELIGIBILITY

- Patient with underlying COPD, being discharged to home setting
- High risk of re-admission
- O₂ requirements stable/down trending and clinical trajectory stable/improving
- Ability to complete tasks and questionnaires in-app (with languages offered) and wear required devices

COMPLICATIONS OR ADVERSE EVENTS

- Increased SOB and respiratory distress (ARDS)
- Activity limitations
- Secondary pneumonia
- Depression
- Pulmonary hypertension, heart failure

CARE PROTOCOL DETAILS

SYMPTOM TRIAGING QUESTIONNAIRES

- Daily Biofourmis COPD symptom checker – assessment for symptoms of respiratory distress, mucus production, chest tightness, fever)
- Bi monthly COPD assessment questionnaire
- Optional PHQ9 (depression survey) – at program initiation

PHYSIOLOGIC MONITORING (DEVICES)

- Everion armband - continuous monitoring of HR, RR, SpO₂, skin temp and activity levels
- Connected BP cuff (Welch Allyn 1700)

ALERTS/ESCALATIONS/CARE COORDINATION

- Daily care team monitoring of
 - Patient questionnaire responses, care plan adherence, alerts and physiologic parameters
 - Comorbidity monitoring and management (diabetes, HTN, CHF)
- Support and intervention via chat/video

APPENDIX

- Detailed questionnaire/PRO's
- Detailed alert thresholds
 - Alert types and definitions
 - Escalation protocols

DAILY TASKS

VITALS MEASUREMENTS; DIARY, LABS, WOUND CARE, IMAGING, ETC

- Daily BP measurements
- Medication adherence tracking (antibiotics, inhaler use, steroid course)
- Daily diary – activity tracking

PATIENT EDUCATION

- COPD education content via patient app

OTHER RECOMMENDED CARE

- Follow-up Labs, if prescribed
- Follow-up Chest x-ray, if prescribed
- FSBS q6hrs, if DM

Pneumonia

ACUTE CARE PATHWAY

OBJECTIVE

Enable physiologic monitoring and geographically-distributed care coordination to ensure effective care for patients with community acquired pneumonia

DURATION

**2-8
DAYS**

ELIGIBILITY

- Patient with clinical or biometric/imaging evidence of CAP requiring IV medications and/or increased oxygen therapy and/or hospital-level respiratory care.
- Exclusion criteria
 - Requiring >4L NC O₂ to maintain baseline saturation.
 - Large pleural effusion or unknown etiology.
 - Worsening respiratory status since presentation.
 - Most recent CURB-65 score >3 or most recent SMRT-CO score >2.
 - Cavitary lesion on imaging.

PRIMARY OUTCOME MEASURES

PROMs

DISEASE-SPECIFIC

30 DAY

ED PRESENTATION

30

DAY
MORTALITY

30

DAY
READMISSION

PATIENT
SATISFACTION
SCORE

CARE PROTOCOL DETAILS

DEVICES

- Everion armband* – continuous HR, RR, SpO₂, skin temperature, and activity
- Connected BP cuff (Welch Allyn 1700, Omron BP7000)
- Connected pulse oximeter (Nonin 3230) if not using Everion
- Oral thermometer

* denotes optional monitoring device based on severity of patient and clinician preference

DAILY MONITORING

- Review physiologic data
- Review subjective patient data (diary)
- Review patient task compliance

CARE COORDINATION

- Telemedicine/virtual visit platform
- Interdisciplinary task management system
- Phlebotomy, radiology and antibiotic administration PRN

ALERTS/THRESHOLDS/ESCALATIONS

- Immediate alerts sent to clinical team for aberrancies to clinician-defined, patient-specific thresholds:
 - Continuous/intermittent vital sign data

Please refer to Appendix for suggested thresholds values and example escalation protocol

Pneumonia

POST-ACUTE CARE PATHWAY

OBJECTIVE

Reduce risk of hospital re-admission, ER visits and premature mortality in these patients, while optimizing patient comfort. Our program targets patients diagnosed and admitted for pneumonia, and now transitioning to home

DURATION

30
DAYS

PRIMARY OUTCOME MEASURES

30 HOSPITAL RE-ADMISSION DAYS RATES

30 DAY MORTALITY

90 DAY MORTALITY

PATIENT SATISFACTION SCORE

ELIGIBILITY

- Age – 18-75; Patient with confirmed diagnosis of Pneumonia and eligible for outpatient monitoring
- Stable or improving symptoms
- Maintains SpO₂ >= 92% on no more than 4L NC, or requires less than 6 hrs O₂
- Ability to complete tasks and questionnaires in-app (with languages offered) and use required devices

COMPLICATIONS OR ADVERSE EVENTS

- Shortness of breath, respiratory distress
- Worsening cough with changing mucus/phlegm and high grade fever
- Confusion and worsening neurological status
- Vomiting and diarrhea
- Chest pain

CARE PROTOCOL DETAILS

SYMPTOM TRIAGE

- Daily Biofourmis Pneumonia symptom checker – assessment for worsening symptoms of respiratory distress, (SOB, trouble breathing, gray/blue lips or nails), chest pain, cough/wheezing, mucus/phlegm production, GI symptoms and neurological status

PHYSIOLOGIC MONITORING (DEVICES)

- Everion armband - continuous monitoring of HR, RR, SpO₂, skin temp and activity levels
- Thermometer

ALERTS/ESCALATIONS/CARE COORDINATION

- Daily care team monitoring of
 - Patient questionnaire responses, alerts and physiologic parameters
 - Comorbidity monitoring and management (diabetes, HTN, COPD)
- Support and intervention via chat/video

APPENDIX

- Detailed questionnaires
- Detailed alert thresholds
 - Alert types and definitions
 - Escalation protocols

DAILY TASKS

- Twice daily temperature (week 1)
- Medication adherence (if prescribed antibiotics)

PATIENT EDUCATION

- Pneumonia education via patient app
 - Timeline and progression of disease
 - When to contact provider and signs of worsening disease

OTHER RECOMMENDED CARE

- IV or IM antibiotic administration support (if prescribed)
- Labs: CBC (if prescribed)
- Follow-up Chest x-ray (if prescribed)

Hypertension

(Hypertensive Urgency/Uncontrolled Hypertension)

ACUTE CARE PATHWAY

OBJECTIVE

Enable physiologic monitoring and geographically-distributed care coordination to ensure effective care for patients with uncontrolled HTN

DURATION

**2-4
DAYS**

PRIMARY OUTCOME MEASURES

PROMs

DISEASE-SPECIFIC

30 DAY

ED PRESENTATION

**30
DAY**

MORTALITY

**30
DAY**

READMISSION

PATIENT
SATISFACTION
SCORE

CARE PROTOCOL DETAILS

DEVICES

- Continuous telemetry (VitalConnect VitalPatch)*
- Connected BP cuff (Welch Allyn 1700, Omron BP7000)
- Connected pulse oximeter (Nonin 3230)*
- Oral thermometer*

* denotes optional monitoring device based on severity of patient and clinician preference

ALERTS/THRESHOLDS/ESCALATIONS

- Immediate alerts sent to clinical team for aberrancies to clinician-defined, patient-specific thresholds:
 - Continuous/intermittent vital sign data

Please refer to Appendix for suggested thresholds values and example escalation protocol

ELIGIBILITY/SCREENING

- Patient with uncontrolled hypertension refractory to outpatient management requiring IV medication, oral titration, or dosage optimization
- Exclusion criteria
 - Hypertensive emergency, continuous IV infusion, labile blood pressure with recurrent hypotension

DAILY MONITORING

- Review physiologic data
- Review subjective patient data (diary)
- Review patient task compliance

CARE COORDINATION

- Telemedicine/virtual visit platform
- Interdisciplinary task management system
- Phlebotomy and anti-hypertensive administration

Hypertension

POST-ACUTE CARE PATHWAY

OBJECTIVE

Reduce risk of hospital readmission, ER visits and premature mortality in HTN patients, while optimizing BP levels. Our program targets patients transitioning to home, after a hospital stay for acute treatment of CHF

DURATION

30
DAYS

PRIMARY OUTCOME MEASURES

30 HOSPITAL RE-ADMISSION DAYS RATES

PATIENT SATISFACTION SCORE

30 90 06
DAYS DAYS MONTH
MORTALITY

G D M T
MEDICATION ADHERENCE

ELIGIBILITY

- Age – 21-75; Patient diagnosed with HTN (either as their primary diagnosis or comorbidity) and eligible for hospital discharge and outpatient monitoring
- Ability to complete tasks and questionnaires in-app (with languages offered) and use required devices
- Exclusion criteria: ionotropic or vasopressor support; severe PH; hypotension

COMPLICATIONS OR ADVERSE EVENTS

- Headaches / Nose bleed
- Pulmonary edema / Heart Failure
- Chest pain / Myocardial infarction
- TIA/ stroke
- Aortic dissection

CARE PROTOCOL DETAILS

SYMPOTM TRIAGING QUESTIONNAIRES

- Daily Biofourmis HTN symptom checker – assessment for symptoms of severe hypertension and hypotension (headache, chest pain, SOB, dizziness, cognitive impairment, visual abnormalities)

PHYSIOLOGIC MONITORING (DEVICES)

- Connected BP cuff (Welch Allyn 1700)

ALERTS/ESCALATIONS/CARE COORDINATION

- Daily care team monitoring of
 - Patient questionnaire responses, care plan adherence, alerts and physiologic parameters
 - Comorbidity monitoring and management (diabetes, Hyperlipidemia)
- Support and intervention via chat/video

DAILY TASKS

VITALS MEASUREMENTS; DIARY, LABS, WOUND CARE, IMAGING, ETC

- Twice daily BP measurements
- Dietary (salt, etc.) intake tracking
- Medication adherence tracking

PATIENT EDUCATION

- HTN education content via patient app
 - Dietary recommendations
 - Lifestyle and exercise recommendations

OTHER RECOMMENDED CARE

- Monitor labs: Renal panel, Urinalysis, Lipid panel, CBC (as prescribed)
- Cardiac, ophthalmology, referrals (if needed, per PCP assessment)

APPENDIX

- Detailed alert thresholds
 - Alert types and definitions
 - Escalation protocols

Diabetes (Hyperglycemia/Mild DKA/Mild HHS)

ACUTE CARE PATHWAY

OBJECTIVE

Enable physiologic monitoring and geographically-distributed care coordination to ensure effective care for patients with hyperglycemia

DURATION

**2-5
DAYS**

PRIMARY OUTCOME MEASURES

PROMs

DISEASE-SPECIFIC

30 DAY ED PRESENTATION

30 DAY MORTALITY

30 DAY READMISSION

PATIENT SATISFACTION SCORE

CARE PROTOCOL DETAILS

DEVICES

- Continuous telemetry (VitalConnect VitalPatch)*
- Connected glucometer (ForaCare Test N Go)
- Connected BP cuff (Welch Allyn 1700, Omron BP7000)
- Connected pulse oximeter (Nonin 3230)*

* denotes optional monitoring device based on severity of patient and clinician preference

ALERTS/THRESHOLDS/ESCALATIONS

- Alerts sent to clinical team for aberrancies to clinician-defined, patient-specific thresholds:
 - Continuous/intermittent vital sign data

Please refer to Appendix for suggested thresholds values and example escalation protocol

ELIGIBILITY/SCREENING

- Patient with uncontrolled hyperglycemia refractory to outpatient management requiring IV insulin, oral titration, and IV hydration
- Exclusion criteria
 - Moderate to severe DKA/HHS, insulin drip, altered mental status

DAILY MONITORING

- Review physiologic data
- Review subjective patient data (diary)
- Review patient task compliance

CARE COORDINATION

- Telemedicine/virtual visit platform
- Interdisciplinary task management system
- Phlebotomy and anti-hyperglycemic administration

Diabetes

POST-ACUTE CARE PATHWAY

OBJECTIVE

Improve blood glucose control in diabetic patients after hospital discharge. By optimizing post-discharge BG control, our pathway can reduce length of hospital stay and reduce risk of hospital readmission, ER visits and premature mortality in patients with labile blood glucose control, regardless of their primary cause of admission

DURATION

30
DAYS

PRIMARY OUTCOME MEASURES

30 HOSPITAL RE-ADMISSION
DAYS RATES

PATIENT SATISFACTION SCORE

30 90 06
DAYS DAYS MONTH
MORTALITY

HbA1c
AT DAY 90

CARE PROTOCOL DETAILS

SYMPTOM TRIAGING QUESTIONNAIRES

- Daily Biofourmis Diabetes symptom checker – assessment for symptoms of hyperglycemia and hypoglycemia (sweating, palpitations, confusion, thirst, dry mouth, blurry vision, increased urination, fatigue)
- Daily food diary – tracking variations in dietary intake

PHYSIOLOGIC MONITORING (DEVICES)

- Connected glucometer (TnG go) with strips, solution and lancets
- Connected BP cuff (Welch Allyn 1700)

ALERTS/ESCALATIONS/CARE COORDINATION

- Care team monitoring of:
 - Patient questionnaire responses, BG trends and physiologic parameters and alerts
 - Other comorbidity monitoring and management (HTN, COPD)
- Support and intervention via chat/video

APPENDIX

- Detailed questionnaires
- Detailed alert thresholds
 - Alert types and definitions
 - Escalation protocols

ELIGIBILITY

- Age – 18-75; Patient with known diabetes (type 1 or 2) as primary diagnosis or comorbidity, and eligible for outpatient monitoring
- Ability to self manage blood glucose via frequent glucometer testing, dietary adjustments, and medication adjustments as needed
- Ability to recognize early symptoms of hypo and hyperglycemia
- Ability to complete tasks and questionnaires in-app (with languages offered) and use required devices

COMPLICATIONS OR ADVERSE EVENTS

- Hyperglycemia, hyperosmolar coma and associated symptoms
- Hypoglycemia and associated symptoms
- DKA (type 1)
- Delayed wound healing
- Development of Hyperlipidemia, Hypertension and metabolic syndrome

DAILY TASKS

VITALS MEASUREMENTS; DIARY, LABS, WOUND CARE, IMAGING, ETC

- Q6 hourly BG readings – categorized by fasting, pre-post meal times
- Daily BP measurement
- Medication adherence and dose tracking (insulin, metformin, SU, others)

PATIENT EDUCATION

- Diabetes education content via patient app
 - When to contact provider and signs of worsening hypo and hyperglycemia

OTHER RECOMMENDED CARE

- Diabetes educator virtual consult
- Dietician virtual consult, if prescribed
- Labs – HbA1c, as prescribed (at 3 months)

Deep Vein Thrombosis

ACUTE CARE PATHWAY

OBJECTIVE

Enable physiologic monitoring and geographically-distributed care coordination of patients with DVT who are starting anticoagulation treatment

DURATION

2-5
DAYS

ELIGIBILITY/SCREENING

- Patient with confirmed DVT requiring admission for anticoagulation initiation, management or bridging of heart failure exacerbation requiring IV diuresis
- Exclusion criteria
 - Hemodynamically unstable (hypotensive), O₂ requirement >4L NC to maintain saturation >90%), requiring IV pain medication

PRIMARY OUTCOME MEASURES

PROMs

DISEASE-SPECIFIC

30 DAY

ED PRESENTATION

30

DAY
MORTALITY

30

DAY
READMISSION

PATIENT
SATISFACTION
SCORE

CARE PROTOCOL DETAILS

DEVICES

- Continuous telemetry (VitalConnect VitalPatch)*
- Connected BP cuff (Welch Allyn 1700, Omron BP7000)
- Connected pulse oximeter (Nonin 3230)
- Oral thermometer*

* denotes optional monitoring device based on severity of patient and clinician preference

DAILY MONITORING BY CLINICAL TEAM

- Review physiologic data
- Review subjective patient data (diary)
- Review patient task compliance

ALERTS/THRESHOLDS/ESCALATIONS

- Immediate alerts sent to clinical team for aberrancies to clinician-defined, patient-specific thresholds:
 - Continuous/intermittent vital sign data
 - Arrhythmia detection*

Please refer to Appendix for suggested thresholds values and example escalation protocol

CARE COORDINATION

- Telemedicine/virtual visit platform
- Interdisciplinary task management system
- Phlebotomy and anticoagulation administration

Deep Vein Thrombosis

POST-ACUTE CARE PATHWAY

OBJECTIVE

Reduce risk of hospital readmission, ER visits and premature mortality in patients diagnosed with DVT, either due to evolution/infection of the DVT, development of a PE or excess coagulation therapy. Our program targets patients transitioning to home, after a hospital stay with a DVT

DURATION

30
DAYS

PRIMARY OUTCOME MEASURES

30 HOSPITAL RE-ADMISSION
DAYS RATES

PATIENT SATISFACTION SCORE

30 90 06
DAYS DAYS MONTH
MORTALITY

CARE PROTOCOL DETAILS

SYMPTOM TRIAGING QUESTIONNAIRES

- Daily Biofourmis DVT symptom checker – assessment for symptoms of potential PE (SOB, chest pain, dizziness, functional status) and signs of excess coagulation (bruising, bleeding)

PHYSIOLOGIC MONITORING (DEVICES)

- Pulse oximeter (Nonin 3203 -spot check)
- Connected BP cuff (Welch Allyn 1700)

ALERTS/ESCALATIONS/CARE COORDINATION

- Daily care team monitoring of
 - Patient questionnaire responses, care plan adherence, alerts and physiologic parameters
 - Comorbidity monitoring and management (diabetes, HTN, COPD)
- Support and intervention via chat/video

APPENDIX

- Detailed questionnaires
- Detailed alert thresholds
 - Alert types and definitions
 - Escalation protocols

ELIGIBILITY

- Age – 18-75; Patient with confirmed diagnosis of DVT on U/S and eligible for outpatient monitoring
- Stable or improving symptoms, afebrile, not on any supplemental oxygen
- No known underlying coagulopathy
- Ability to complete tasks and questionnaires in-app (with languages offered) and use required devices

COMPLICATIONS OR ADVERSE EVENTS

- Pulmonary embolism – leading to shortness of breath, chest pain, worsening cough, palpitations, sweating
- Thrombophlebitis – secondary site infection, with chills/sweats
- Painful affected limb (increased swelling, inflammation)
- Confusion and worsening neurological status
- Complications of excess anticoagulation therapy – bruising, bleeding, dark colored stools

DAILY TASKS

VITALS MEASUREMENTS; DIARY, LABS, WOUND CARE, IMAGING, ETC

- Daily ambulation plan
- Medication adherence monitoring (if prescribed antibiotics, or anticoagulants)
- Pulse oximeter spot checks – initially Q6 hourly
- Daily BP measurements

PATIENT EDUCATION

- DVT education content via patient app
 - When to contact provider and signs of worsening disease

OTHER RECOMMENDED CARE

- IV or IM antibiotic administration support (if prescribed)
- IV or IM anti-coagulation administration support (if prescribed)
- INR monitoring (if on Warfarin)

COVID

ACUTE CARE PATHWAY

OBJECTIVE

Enable physiologic monitoring and geographically-distributed care coordination to ensure effective care for patients with COVID-19

DURATION

**2-6
DAYS**

PRIMARY OUTCOME MEASURES

PROMs

DISEASE-SPECIFIC

30 DAY ED PRESENTATION

30 DAY MORTALITY

30 DAY READMISSION

PATIENT SATISFACTION SCORE

CARE PROTOCOL DETAILS

DEVICES

- Everion armband* – continuous HR, RR, SpO₂, skin temperature, and activity
- Connected BP cuff (Welch Allyn 1700, Omron BP7000)
- Connected pulse oximeter (Nonin 3230) if not using Everion
- Oral thermometer

* denotes optional monitoring device based on severity of patient and clinician preference

ALERTS/THRESHOLDS/ESCALATIONS

- Immediate alerts sent to clinical team for aberrancies to clinician-defined, patient-specific thresholds:
 - Continuous/intermittent vital sign data

Please refer to Appendix for suggested thresholds values and example escalation protocol

ELIGIBILITY

- Patient with diagnostic evidence of COVID-19 requiring IV medications and/or increased oxygen therapy and/or hospital-level respiratory care.
- Exclusion criteria
 - Increasing O₂ req or requiring >4L NC to maintain sat>92%.
 - Concern for concomitant PE.
 - Moderate/high prob of ICU-level care need (e.g. unvaccinated and immunocompromised).
 - Altered mental status.

DAILY MONITORING

- Review physiologic data
- Review subjective patient data (diary)
- Review patient task compliance

CARE COORDINATION

- Telemedicine/virtual visit platform
- Interdisciplinary task management system
- Phlebotomy, radiology, and antiviral administration PRN

COVID

POST-ACUTE CARE PATHWAY

OBJECTIVE

Reduce risk of hospital admission, ER visits and premature mortality in COVID patients, while optimizing patient comfort. Our program targets patients diagnosed with COVID, requiring additional support, and transitioning to - or eligible for - home-based treatment

DURATION

14
DAYS

PRIMARY OUTCOME MEASURES

30 HOSPITAL RE-ADMISSION DAYS RATES

30 DAY MORTALITY

PATIENT SATISFACTION SCORE

ELIGIBILITY

- Age – 18-75; Patient with confirmed diagnosis of COVID and eligible for outpatient monitoring
- Stable or improving symptoms
- Maintains SpO₂ >= 92% on no more than 4L NC, or requires less than 6 hrs O₂
- Ability to complete tasks and questionnaires in-app (with languages offered) and use required devices

CARE PROTOCOL DETAILS

SYMPOTM TRIAGING QUESTIONNAIRES

- Daily Biofourmis COVID symptom checker – assessment for worsening symptoms of respiratory distress, (SOB, trouble breathing, gray/blue lips or nails), chest pain, cough, GI symptoms and neurological status

PHYSIOLOGIC MONITORING (DEVICES)

- Everion armband - continuous monitoring of HR, RR, SpO₂, skin temp and activity levels
- Thermometer

ALERTS/ESCALATIONS/CARE COORDINATION

- Daily care team monitoring of
 - Patient questionnaire responses, alerts and physiologic parameters
 - Comorbidity monitoring and management (diabetes, HTN, COPD)
- Support and intervention via chat/video

APPENDIX

- Detailed questionnaires
- Detailed alert thresholds
 - Alert types and definitions
 - Escalation protocols

DAILY TASKS

VITALS MEASUREMENTS; DIARY, LABS, WOUND CARE, IMAGING, ETC

- Twice daily temperature

PATIENT EDUCATION

- COVID education via patient app
 - Timeline and progression of disease
 - When to contact provider and signs of worsening disease
 - Current contact isolation recommendations (per CDC)

OTHER RECOMMENDED CARE

- N/A

APPENDIX

Cellulitis Questionnaire

Question	Response
1. In the past 24 hours, have you noticed any changes to the infected skin area, or worsening symptoms (fever, pain, dizziness, shortness of breath)	If yes, then trigger remainder of questionnaire; otherwise end survey
A. In the past 24 hours, have you had a fever?	Yes No Less than 38 degrees C 38 to 38.9 degrees C 39 to 40 degrees C Greater than 40 degrees C Did not take temperature – I just feel warm
B. In the past 24 hours, have you had any chills or sweats?	None Yes, chills only Yes, sweating only Yes, both
C. In the past 24 hrs, has the infected area felt more painful?	No Yes, Mildly (e.g. with touch) Yes, Moderately Yes, Severely
D. In the past 24 hours, has the area felt warmer to touch?	No Yes, Mild Yes, Moderate Yes, Severe
E. During the past 24 hours, has the area increased in size or changed in appearance (i.e. developed streaks)?	No Yes, Mildly increased Yes, Moderately increased Yes, increased with streaking
F. During the part 24 hours, has the infected area felt more "full" or "tight"?	No Yes, Mild Yes, Moderate Yes, Severe
G. In the past 24 hours, has there been any discharge (clear or yellow) or breakdown in skin around the area?	No Mild Moderate Severe
H. Optional: In the past 24 hours, do you feel more tired than usual?	No Mild Moderate Severe
I. Over the last 24 hours, have you been taking your antibiotics, as prescribed?	Yes/ No
J. [If no to above] What is the reason for not taking your antibiotics?	I forgot to take it Other reasons

COPD Assessment Test

Question	Response
1. Please indicate which best describes you currently (cough)	0 (I never cough) 1 2 3 4 5 (I cough constantly)
2. Please indicate which best describes you currently (phlegm)	0 (I do not have phlegm (mucus) in my chest) 1 2 3 4 5 (My chest is filled with phlegm (mucus))
3. Please indicate which best describes you currently (tightness)	0 (I do not feel tightness in my chest) 1 2 3 4 5 (My chest feels very tight)
4. Please indicate which best describes you currently (stairs)	0 (I do not get out of breath when I walk up a hill or a flight of stairs) 1 2 3 4 5 (I get very breathless when I walk up a hill or a flight of stairs)
5. Please indicate which best describes you currently (daily activities)	0 (I am not limited in doing my daily activities at home) 1 2 3 4 5 (I am very limited in doing my daily activities at home)
6. Please indicate which best describes you currently (home)	0 (I feel confident leaving my home even with my lung condition) 1 2 3 4 5 (I do not feel confident leaving my home due to my lung condition)
7. Please indicate which best describes you currently (sleep)	0 (I sleep well) 1 2 3 4 5 (I don't sleep well due to my lung condition)
8. Please indicate which best describes you currently (energy)	0 (I have a lot of energy) 1 2 3 4 5 (I don't have any energy)

COPD Questionnaire

Question	Response
1. Were there any changes in your breathing yesterday?	No shortness of breath. Some shortness of breath. Short of breath. Increased shortness of breath. Extreme shortness of breath.
2. Did experience any issues with with your breathing yesterday while completing activities?	No shortness of breath. Some shortness of breath. Short of breath. Increased shortness of breath. Extreme shortness of breath.
3. Was your activity level affected by your breathing yesterday?	I was able to do everything I wanted to do. I did most everything I wanted to do. I wish I could have done more. I had trouble doing most activities. I couldn't do anything I wanted to do.
4. In the past 24 hours, have you experienced a fever?	Yes/ No Less than 37.2 degrees C 37.2 to 38.9 degrees C 39 to 40 degrees C Greater than 40 degrees C Did not take temperature – I just feel warm
5. Are you experiencing any cough and/or any wheezing?	Yes/ No
6. Have you noticed an increase in your coughing?	Yes/ No
7. Has there been an increase in mucus and/or phlegm in the last 24 hours?	Yes/ No
8. Have you seen a difference in the color of the mucus or phlegm in the last 24 hours?	Yes/ No
9. What is the color of the mucus and/or phlegm	Yellow Green Brown Clear
10. Have you been using your daily maintenance inhaler as prescribed?	Yes/ No
11. What is the reason for not taking your daily maintenance inhaler?	I didn't remember to use it Other reasons
12. Did you use your rescue inhaler in the last 24 hours?	Yes/ No

COVID Questionnaire

Question	Response
1. Do you have any of these life-threatening symptoms? If yes to ANY - call 911	- Pale, gray, or blue-colored skin, lips, or nail beds, depending on skin tone - Severe and constant pain or pressure in the chest - Difficulty breathing (such as gasping for air, being unable to walk or talk without catching your breath, Severe wheezing, nostrils flaring, grunting, or ribs or stomach moving in and out deeply and rapidly as you breathe) - New disorientation (acting confused) - Unconscious or very difficult to wake up - Slurred speech or Difficulty speaking (New or worsening) - New or worsening seizures - Signs of low blood pressure (too weak to stand, dizziness, lightheaded, feeling cold, Pale, clammy skin) - Dehydration (dry lips and mouth, not urinating much, sunken eyes) - None of the above
2. Are you experiencing any cough, wheezing or shortness of breath?	Yes/ No
3. Were there any changes in your breathing since yesterday?	No difficulty breathing Increased shortness of breath with moderate activity (walking, climbing stairs) Increased shortness of breath with mild activity (showering, minimal walking) Increased shortness of breath at rest
4. Have you noticed an increase in your coughing?	Yes/ No
5. Did experience any issues with your breathing yesterday while completing activities?	No shortness of breath. Some shortness of breath. Short of breath. Increased shortness of breath. Extreme shortness of breath.
6. In the past 24 hours, have you experienced a fever?	No Less than 37.2 degrees C 37.2 to 38.9 degrees C 39 to 40 degrees C Greater than 40 degrees C Did not take temperature – I just feel warm
7. Have you experienced any of the following as new onset or worsening symptoms (choose any that apply):	1 . Sore throat 2. Muscle aches or body aches 3. Unusual fatigue 4. Headache 5. New loss of taste or smell 6. Congestion or runny nose 7. Nausea or vomiting 8. Diarrhea 9. Other symptoms 10. No symptoms

Deep Venous Thrombosis Questionnaire

Question	Response
1. In the past 24 hours, have you noticed any worsening symptoms (fever, dizziness, shortness of breath, pain), or changes to your affected limb?	If yes, then trigger remainder of questionnaire; otherwise end survey
2. In the past 24 hours, have you had a fever?	Yes/ No Less than 38 degrees C 38 to 38.9 degrees C 39 to 40 degrees C Greater than 40 degrees C Did not take temperature – I just feel warm
3. During the last 24 hours, have you had any chills or sweats?	No Yes, chills only Yes, sweating only Yes, both
4. In the past 24 hours, has your affected limb (leg or arm) felt more painful?	No Yes, Mildly (e.g. with touch) Yes, Moderately Yes, Severely
5. In the past 24 hours, has your affected limb felt more swollen, "full" or "tight"?	None Yes, Mild Yes, Moderate Yes, Severe
6. In the past 24 hours, have there been any changes in your breathing (faster, more painful)?	No shortness of breath. Some shortness of breath. Short of breath. Increased shortness of breath. Extreme shortness of breath. Painful breathing
7. Have you experienced dizziness or lightheadedness in the past 24 hours?	Yes/ No
8. Are you currently on a blood thinning medication? If yes:	Yes/ No
a. Have you been taking your daily blood thinning medication as prescribed?	
b. [If no to above] What is the reason for not taking your blood thinning medication?	I forgot to take it Other reasons
c. Have you noticed increased bruising anywhere on your body?	Yes/ No
d. Have you noticed any blood in your urine or stool? Or have you had dark-colored stools? Or have you had prolonged bleeding from a cut?	Yes/ No

Diabetes Questionnaire

Question	Response
1. Have you had any abnormal blood glucose readings in the last 24 hours? OR have you had any symptoms of: a. Low blood glucose (e.g. sweating, palpitations, confusion or dizziness), OR b. High blood glucose (e.g. increased thirst, dry mouth, increased urination, hunger, blurry vision, fatigue)	If yes, then trigger remainder of questionnaire; otherwise end survey
A. In the last 24 hrs, have you had low blood sugar (glucose) with symptoms such as sweating, weakness, confusion, shaking, hunger or lightheadedness, dizziness or palpitations?	Yes, multiple episodes, OR 1 episode lasting more than 15 min Yes, a single episode for less than 15 min No
B. [If yes, above] Could this be because: (click all that may apply) a) you were sick or had an infection? c) you took the wrong amount/timing for medicine? d) you ate inappropriate types of food? e) you ate too little food? f) you had more physical activity than usual? g) you waited too long to eat or skipped a meal? h) you were feeling stressed, upset or angry? i) I do not know	
C. In the last 24 hrs, have you had high blood sugar (glucose) with symptoms such as increased thirst, dry mouth and skin, increased urination, blurry vision, decreased appetite, nausea, vomiting, or fatigue?	Yes, multiple episodes, OR 1 episode lasting more than 15 min Yes, a single episode for less than 15 min No
D. [If yes to above] Could this be because (click all that you suspect):	a) you were sick or had an infection? b) you took the wrong amount/time of medicine, or missed a dose? c) you ate inappropriate types of food? d) you ate more food than usual? e) you had less physical activity than usual? f) you were feeling stressed, upset or angry? g) I do not know
E. Have you been taking your daily diabetes medications, (including insulin, if applicable) as prescribed?	Yes/ No
F. [If no to above] Why are you not taking your medication or insulin?	I forgot to take it Other reasons
G. Have you noticed a decrease in your energy levels or increased fatigue over the last 24 hours?	Yes/ No
H. Have you had any dizziness, lightheadedness or confusion over the last 24 hours?	Yes/ No
I. Have you had any nausea, vomiting or diarrhea over the last 24 hours?	Yes/ No

Heart Failure Questionnaire

Question	Response
1. Were there any changes in your breathing yesterday?	No shortness of breath. Some shortness of breath. Short of breath. Increased shortness of breath. Extreme shortness of breath.
2. Were your activities affected by your breathing yesterday?	I was able to do everything I wanted to do. I was able to do most everything I wanted to do. I wish I could have done more, but was unable. I wasn't able to what I wanted to do. I could not get out of bed without help.
3. Did you use a chair or additional pillows to sleep last night?	Yes/ No
4. Did you encounter shortness of breath first thing in the morning?	Yes/ No
5. Did you notice any swelling in your hands, lower legs, or feet yesterday?	Yes/ No
6. Since yesterday, did you experience dizziness or lightheadedness?	Yes/ No

Pneumonia Questionnaire

Question	Response
1. Did you fill your antibiotic prescription?	Yes/ No
2. Are you still taking your antibiotics as prescribed?	Yes/ No
3. Are you feeling better?	Yes/ No
4. Are you experiencing any cough and/or any wheezing?	Yes/ No
5. Have you noticed an increase in your coughing?	Yes/ No
6. Has there been an increase in mucus and/or phlegm in the last 24 hours?	Yes/ No
7. Have you seen a difference in the color of the mucus or phlegm in the last 24 hours?	Yes/ No
8. What is the color of the mucus and/or phlegm (cascade this question only if previous question is positive)	Yellow Green Brown Clear
9. Were there any changes in your breathing since yesterday?	No shortness of breath Some shortness of breath Still short of breath Increased shortness of breath Extreme shortness of breath
10. Were your activities affected by your breathing yesterday?	I was able to do everything I wanted to do I was able to do most everything I wanted to do I wish I could have done more, but was unable I wasn't able to do what I wanted to do I could not get out of bed without help

Urinary Tract Infection Questionnaire

Question	Response
1. Have you had frequent urination of small volumes of urine (going to the toilet very often)in the past 24 hours, and how severe were they?	None Yes, Mild Yes, Moderate Yes, Severe
2. Have you had urinary urgency (a strong and uncontrollable urge to pass urine)in the past 24 hours, and how severe were they?	None Yes, Mild Yes, Moderate Yes, Severe
3. Have you had pain or burning while urinatingin the past 24 hours, and how severe were they?	None Yes, Mild Yes, Moderate Yes, Severe
4. Have you had incomplete bladder emptying after urinationin the past 24 hours, and how severe were they?	None Yes, Mild Yes, Moderate Yes, Severe
5. Have you had pain or discomfort in the lower abdomenin the past 24 hours, and how severe were they?	None Yes, Mild Yes, Moderate Yes, Severe
6. Have you had visible blood in your urinein the past 24 hours, and how severe were they?	None Yes, Mild Yes, Moderate Yes, Severe
7. Please indicate the current level of your Urinary Tract Infection symptoms	No Symptoms at All Mild Moderate Severe

Universal Alert Thresholds

Vital Collected	Symptom	Condition	Event Trigger Threshold Value
SpO2	SpO2 - Low Oxygen Saturation	Less Than	92%
Biovitals Index	Biovitals Index - High Biovitals Index	Greater Than	0.7
Blood Pressure	Blood Pressure - Low Systolic BP	Less Than, or Equal	90
Blood Pressure	Blood Pressure - High Systolic BP	Greater Than, or Equal	180
Blood Pressure	Blood Pressure - Low Diastolic BP	Less Than, or Equal	50
Blood Pressure	Blood Pressure - High Diastolic BP	Greater Than, or Equal	100
Respiration Rate	Respiration Rate - Low Respiration Rate	Less Than	8
Respiration Rate	Respiration Rate - High Respiration Rate	Greater Than	24
Heart Rate	Heart Rate - High Heart Rate	Greater Than	120
Heart Rate	Heart Rate - Low Heart Rate	Less Than	55
Skin Temperature	Temperature - High Skin Temperature	Greater Than	37.5
Body Temperature	Temperature - High Fever	Greater Than	38.5 C
Glucose	Glucose - Low	Greater Than, or Equal	2.8 mmol
Glucose	Glucose - High	Greater Than, or Equal	16.7 mmol
Weight	Weight - Weight Gain	Less Than, or Equal	.9 kg per day
Weight	Weight - Weight Gain	Greater Than, or Equal	2.3 kg per week