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Transitioning Mechanical Ventilation across the care continuum: The Hospital to Home story

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innovation you

Objectives

- Describe the Why, Who, and How of Home Ventilatory Support
- Understand the clinical applications of AVAPS
- Understand the clinical and hospital value of AVAPS-AE
- Understand our technologies and the COPD patient journey

Why Provide Home Ventilatory Support

- Economics
  - Up to 70% cost savings compared to MV in ICU
  - Cost of home MV ranges from $3,500-8,500 per month
- Improved Quality of Life indicators
- Enhanced social interactions
- Reduced infection rate
- Alternate sites include: LTACH, Skilled nursing facilities, Home sites

Who is a candidate for home MV?

- COPD patients (typically Gold stage III and IV)
- Neuromuscular patients (ALS, DMD, SMA, etc.)
- Chronic Hypoventilation syndrome patients

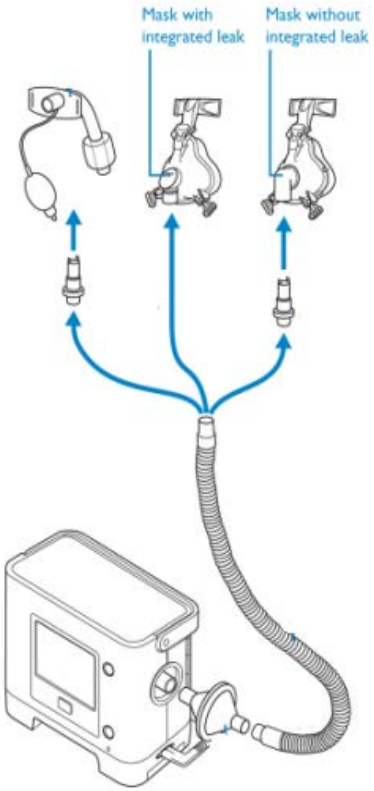
Transition key components

- Device Selection
- Interface Selection
- Mode Selection
- Settings optimization/titration
- Alarm management
- Oxygen needs and delivery options

Transition key components (cont.)

- Humidification
- Secretion management
- Patient and caregiver education/training/troubleshooting
- Case management to incorporate and organize multidisciplinary approach
- Home provider
- Reimbursement issues

Trilogy100 Circuit Options – Passive



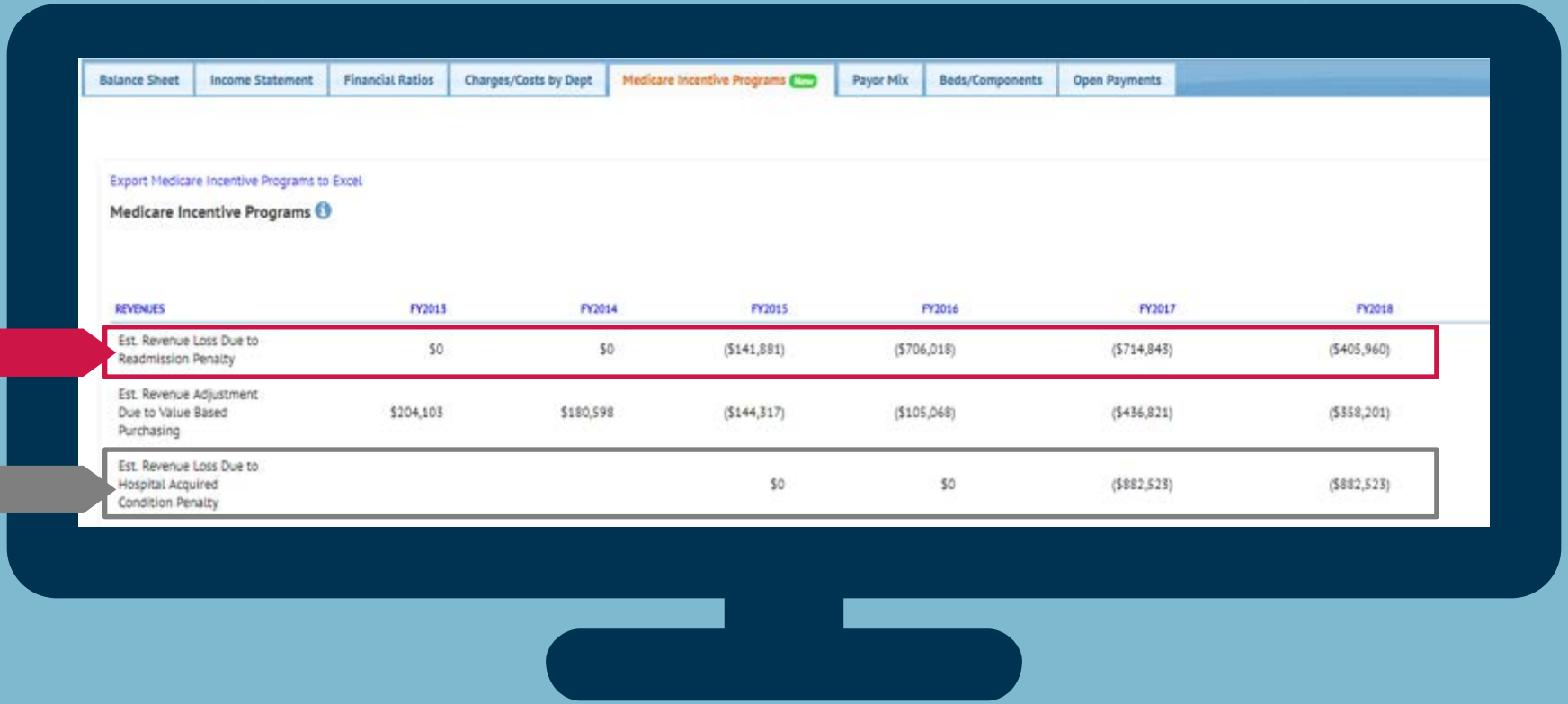
- Utilizes an Exhalation Port
  - Integrated into a mask
  - Whisper Swivel II
- Passive Porting Block

- Choose Passive in Set up Menu

Failed approach

ED - ICU → General ward → Home → Repeat

Example: Hospital impacted by readmissions



REVENUES	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
Est. Revenue Loss Due to Readmission Penalty	$0	$0	($141,881)	($706,018)	($714,843)	($405,960)
Est. Revenue Adjustment Due to Value Based Purchasing	$204,103	$180,598	($144,317)	($105,068)	($436,821)	($358,201)
Est. Revenue Loss Due to Hospital Acquired Condition Penalty			$0	$0	($882,523)	($882,523)

Transitional care approach

Readmission prevention begins in the hospital

AVAPS-AE

AVAPS-AE

Shown to reduce readmission.* **Start early in the hospital.**

* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4442227/

COPD Transitional Care Story

ER	ICU	General Ward	Home
V60 	V60 	V30 	Trilogy 
• Acute exacerbation of COPD with hypercapnic respiratory failure • Unstable, high-acuity patients • Unanticipated, undiagnosed conditions • High RT touch	• Higher risk patient • High RT touch • As patient stabilizes, transition to AVAPS	• Stable patients • Lower acuity and RT touch • AVAPS-AE automates adjustment in absence of RT: “Virtual RT”	• Self-sufficient, stable patients • Low RT touch, monthly visit typical • AVAPS-AE automates adjustment in absence of RT

Consistent High-Acuity Care

Transition to AVAPS-AE as RT Touch decreases

Reduce or eliminate unnecessary readmission

Patient journey

AECOPD presents to the ED

Presentation: High work of breathing, shortness of breath, discomfort, tachycardia, hypotension or hypertension, anxious, sense of ‘suffocation’ or ‘drowning,’ erratic/chaotic breathing

Place on V60, S/T or AVAPs

Assessment is vital. Rapid changes to NIV settings are based on:

- ABG results
- Blood pressure
- Patient comfort and WOB
- Sudden changes in compliance (V_T)
- May need to make changes to IPAP, EPAP, FiO_2, Rise time

Benefits of Philips V60 in this scenario:

- Clinicians can make changes to S/T settings quickly
- Large screen for monitoring and alarm management

If hemodynamically stable, transfer to ICU

Example: Transferred to ICU with V60, S/T

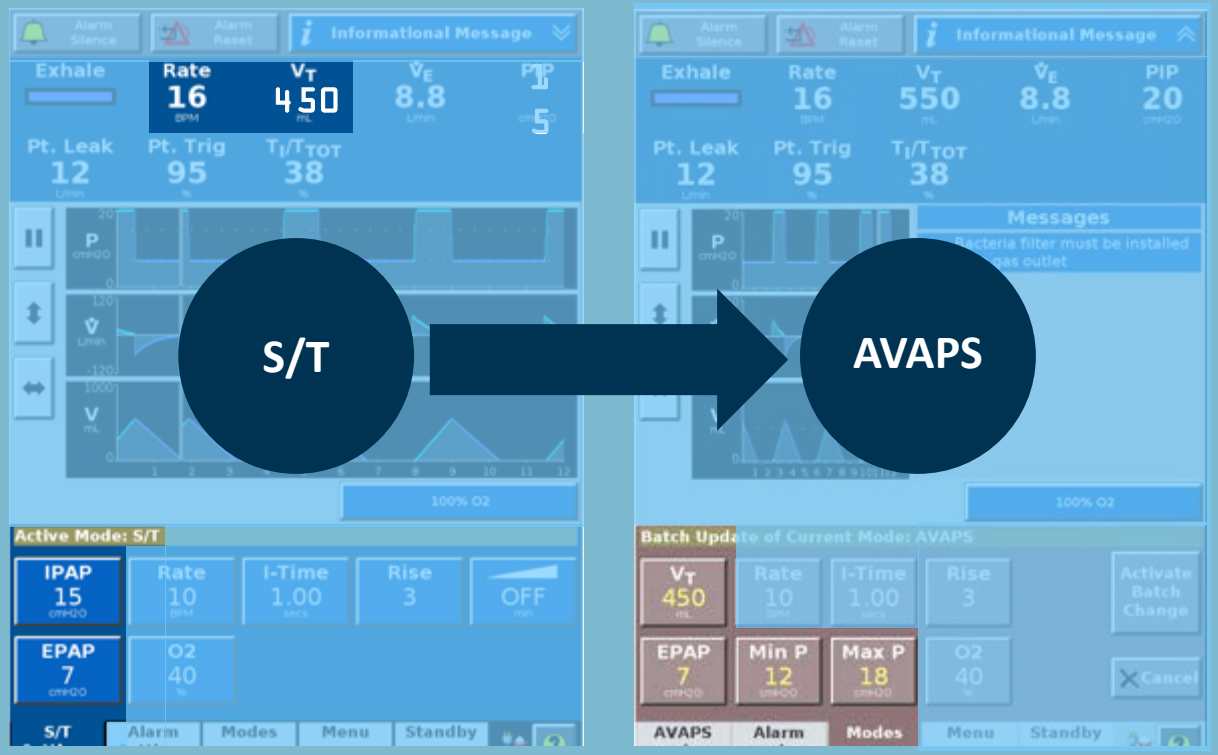
Upon patient and NIV stabilization consider AVAPS

- Vt
- EPAP
- Rate
- FiO_2
- Min P and Max P
- Rise time

Mode:	S/T
IPAP:	15 cmH_2O
EPAP:	7 cmH_2O
V_T measured:	~450mL
Rate:	10 bpm

Mode:	AVAPS
Min P:	12 cmH_2O
Max P:	22-25 cmH_2O
EPAP:	7 cmH_2O
V_T (set):	6-8 mL/Kg
Rate:	10 bpm

Example



Start-up algorithm
AVAPS will choose from the highest of these three:

1. **IPAP Minimum:** I this example, IPAP minimum = **15cmH_2O**
2. **(V_T/60ml/cmH_2O) + EPAP:** (450mL/60ml/cmH_2O) + 7 = **14.5cmH_2O**
3. **8 cmH_2O + EPAP:** 8cmH_2O + 7cmH_2O = **15cmH_2O**

Benefits of AVAPS in ICU

Clinical

- Lowest pressure support to achieve target volume
- Less sedation[1]
- Improves gas exchange[1,2,3]
  - **Small** changes to $PaCO_2$ lead to **significant** outcomes
- Improves patient comfort and compliance[1]
- Improved Health-Related Quality of Life (HRQL)[3]
- Improved sleep quality[3]

Workflow

- Smart algorithm with ongoing monitoring and adjustments
- Clinician is in control; AVAPS does the work
- Incremental IPAP changes (up to 2.5 cmH2O/min) to minimize sudden mask leaks and sleep disturbances

1. Canpolat G, Ozgultekin A, Turan G, Iskender A, Adiyeke E, Ekinci O. Does average volume-assured pressure support make any difference compared with BIPAP? *Critical Care*. 2014;18(Suppl 1):P265. doi:10.1186/cc13455.
2. Windisch, Wolfram. "Average Volume-Assured Pressure Support in Obesity Hypoventilation." CHEST 130 (2006): 815 With respiratory insufficiency patients diagnosed with Obesity Hypoventilation Syndrome
3. Murphy, PBThorax thoraxjnl-2011-201081: Published Online First: 1 March 2012 doi:10.1136/thoraxjnl-2011-201081 Produces results comparable to sleep lab titration of PS

V30 is the cornerstone in this story

For a successful transition home Philips solutions enable consistent modes, features and patient experience for an easy return home.

ER	ICU	General Ward	Home
V60 	V60 	V30 	Trilogy 

Transition to AVAPS to provide consistent ventilation of dynamic patients

Transition to AVAPS-AE to ready the patient for home

Reduce or eliminate unnecessary readmission

Clinical application of AVAPS-AE

Treatment of COPD

COPD and readmission: **AVAPS-AE**

- Maintain stable and secure ventilation
- Lowest pressure support to achieve target volume
- Adjusting EPAP to maintain open airway
- Identifies and retains PS requirements

Obstructive sleep apnea: Auto-**CPAP and Auto-bilevel**

- Reverse upper airway obstruction

Prevent respiratory failure: **AVAPS-AE**

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AVAPS-AE

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Change the cycle of readmissions

Introduce AVAPS-AE in the hospital

Patient education

Pulmonary rehabilitation

Multidisciplinary care team

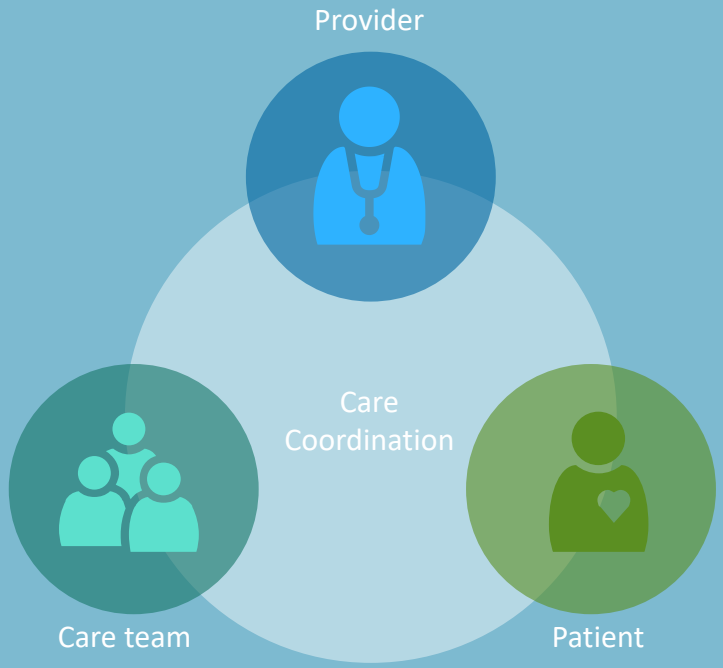
Medication reconciliation

Follow-up plan prior to discharge

Device / therapy reconciliation

Remote ventilator monitoring with

Care Orchestrator



Chronic Obstructive Pulmonary Diseases:
Journal of the COPD Foundation

National COPD Readmissions Summit

The 2nd National COPD Readmissions Summit and Beyond: From Theory to Implementation

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Catherine S. Jones, PhD, APRN, ANP-C[3] Leonard Fromer, MD[4] Barbara P. Yawn, MD, MSc
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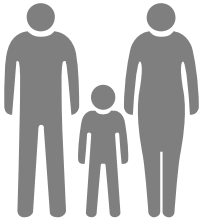
Abstract

Chronic obstructive pulmonary disease (COPD) hospitalizations and readmissions adversely impact the health and quality of life of COPD patients. Under the Hospital Readmissions Reduction Program, the Centers for Medicare & Medicaid Services reduce payments to those hospitals exceeding expected rates of COPD readmissions within 30 days of hospital discharge. It was within this climate that the COPD Foundation held its 2nd COPD Readmissions Summit in March 2015. Experts in attendance: (1) categorized challenges to optimal COPD care, (2) analyzed the state of care delivery and readmissions reduction strategies and (3) identified the best available evidence-based approaches to improving care delivery across the continuum, including early diagnosis via spirometry, ongoing device, oxygen and medication reconciliation, treatment that addresses comorbidities and preventive care, robust patient education, prompt post-acute follow up, home health services and pulmonary rehabilitation. Results of this collaborative event formed the basis for PRAXIS, the COPD Foundation's initiative to improve COPD care across the health continuum and to reduce readmissions.

Experts in attendance identified the best available evidence-based approaches to improving care delivery across the continuum, including **ongoing device reconciliation**

A **culture** of readmission reduction

Medication reconciliation



Family

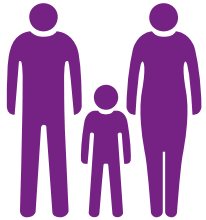
Physician

Respiratory therapist

RN

Discharge planner

Therapy reconciliation



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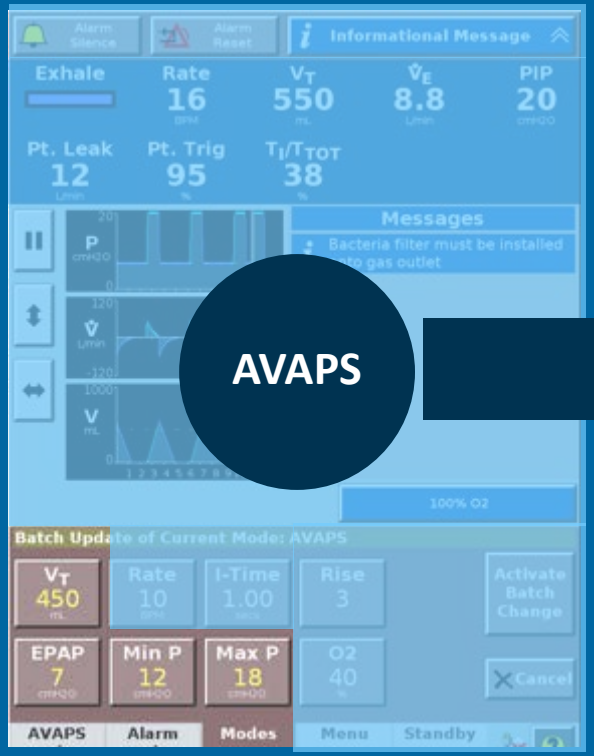
Example



AVAPS → AVAPS-AE

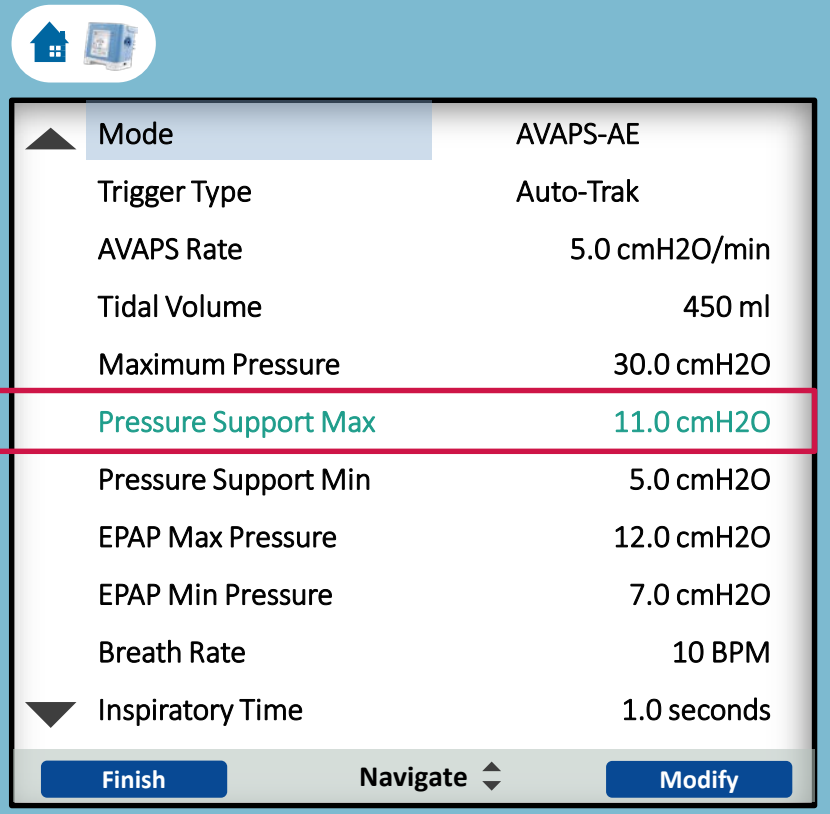
Mode	AVAPS-AE
Trigger Type	Auto-Trak
AVAPS Rate	5.0 cmH2O/min
Tidal Volume	450 ml
Maximum Pressure	30.0 cmH2O
Pressure Support Max	11.0 cmH2O
Pressure Support Min	5.0 cmH2O
EPAP Max Pressure	12.0 cmH2O
EPAP Min Pressure	7.0 cmH2O
Breath Rate	10 BPM
Inspiratory Time	1.0 seconds

Finish | Navigate | Modify

Transitioning home

Increasing **Pressure Support Max** allows algorithm autonomy

After the initial session the device will remember the last effective PS and start at it



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Finish Navigate Modify

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Finish Navigate Modify

Transition home

- AVAPS-AE with Trilogy
- Care Orchestrator for wireless remote ventilator monitoring
- RT driven disease management programs

Versatile, flexible, proven

Discharge Planning

- Discharge planning starts on admission!
- Case manager is central to organizing care and education (COPD Navigator)
- Multidisciplinary approach
- Transition within hospital under controlled environment, but with home equipment and support
- Patient self-care education and disease management is also key to success
- Remote monitoring and follow up care


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