Improving Care & Outcomes

Macquarie Technology Day, 20 October 2011

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Improving Care & Outcomes

- The Care Continuum - ***Matthew Payton***
- F&P Optiflow - ***Matthew Payton***
- F&P Info Technologies - ***Lewis Gradon***
- ICON with SensAwake – ***Emma Duckworth***

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OSA Compliance Monitoring

- **Galetke W et al. Respiration 82(2): 155-61: (2011)**
  - 303 patients, Median follow-up was 13 months (range 7-18 months)
  - 63% still used the PAP device regularly
  - 27.4% had definitively discontinued PAP treatment
  - 9.5% discontinued PAP treatment within the first 3 months
- **Propescu et al, *Thorax* 2001;56;727-733**
  - 209 diagnosed
  - 196 tried CPAP
  - 153 continued after 2 weeks (22% drop out)
  - 131 data available after 1 year
  - 81% > 2 hours
  - 76.6% > 3 hours
  - 68.8% > 4 hours

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OSA Compliance Monitoring

- US Medicare compliance 4 hours/night for 21 days, 30 day window, 90 day time period. Some private insurance companies moving to a yearly or 6 monthly check on patient usage
- France 3 hours average /night checked yearly from date the CPAP is issued
- Germany 3 hours /night average checked yearly
- Holland 4 hours /night checked yearly
- Italy and Spain depends on which region, similar

Trend towards reimbursement based on proof of usage

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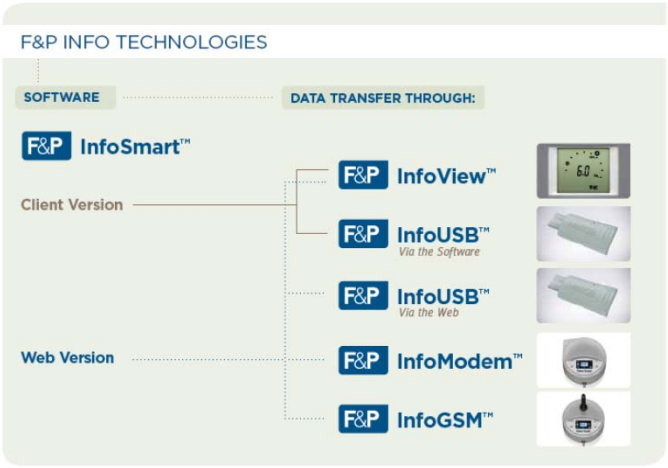
F&P Info Technologies™



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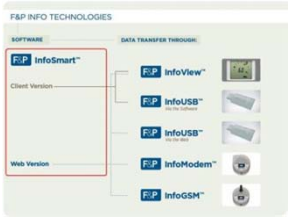
F&P Info Technologies

F&P InfoSmart™

- Advanced patient management system compatible with all F&P CPAP devices
- Computer or web-based application
- Data reporting available:
  - Compliance from first use (cumulative)
  - Usage and efficacy data for up to 365 days
  - Detailed efficacy data (7 nights)



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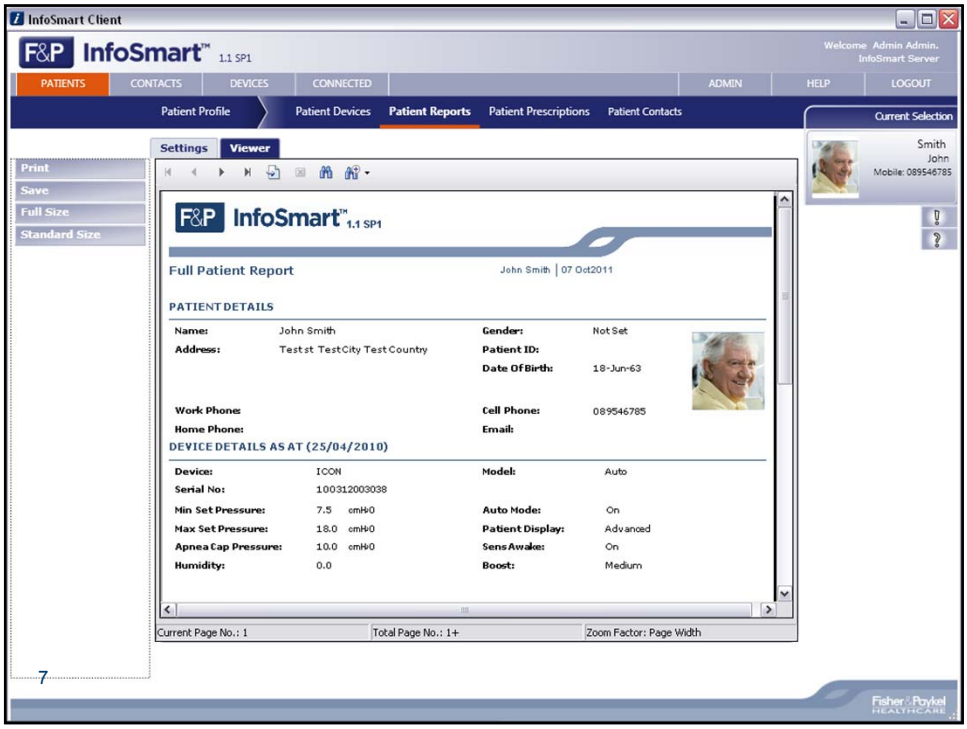
InfoSmart Client
InfoSmart 1.1 SP1
Welcome Admin Admin.
InfoSmart Server
PATIENTS
CONTACTS
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Patient Profile
Patient Devices
Patient Reports
Patient Prescriptions
Patient Contacts
Current Selection
Smith
John
Mobile: 089546785
Settings
Viewer
Print
Save
Full Size
Standard Size
Full Patient Report
John Smith | 07 Oct2011
PATIENT DETAILS
Name: John Smith
Address: Teststt TestCity Test Country
Gender: Not Set
Patient ID:
Date Of Birth: 18-Jun-63
Work Phone:
Home Phone:
Cell Phone: 089546785
Email:
DEVICE DETAILS AS AT (25/04/2010)
Device: ICON
Model: Auto
Serial No: 100312003038
Min Set Pressure: 7.5 cmH0
Max Set Pressure: 18.0 cmH0
Apnea Cap Pressure: 10.0 cmH0
Humidity: 0.0
Auto Mode: On
Patient Display: Advanced
SensAwake: On
Boost: Medium
Current Page No.: 1
Total Page No.: 1+
Zoom Factor: Page Width
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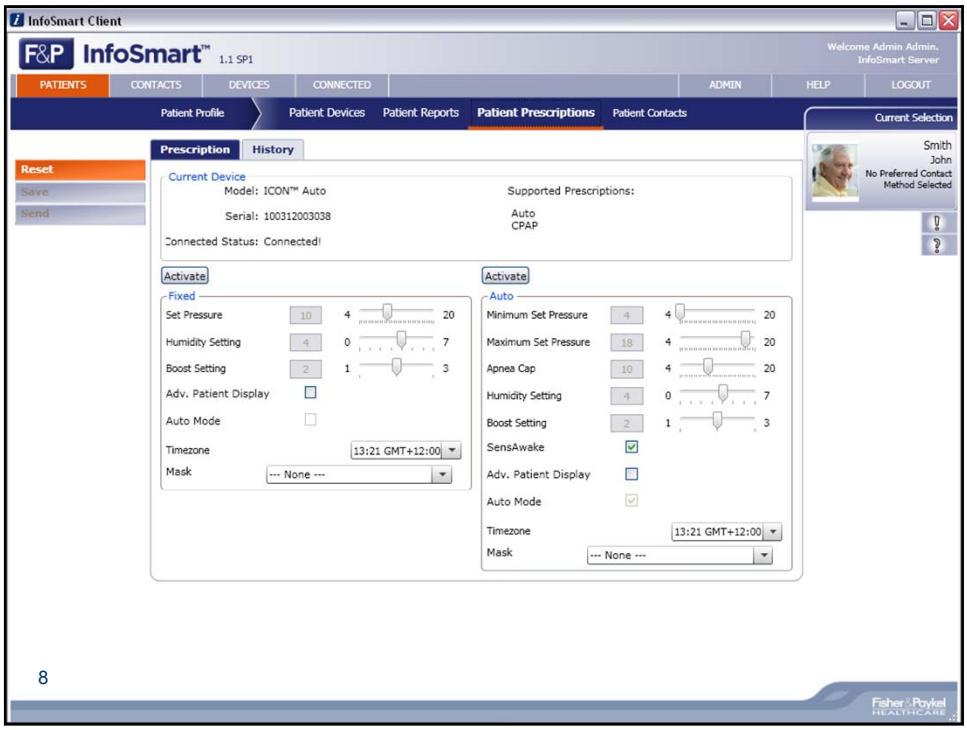
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Patient Reports
Patient Prescriptions
Patient Contacts
Current Selection
Smith
John
No Preferred Contact Method Selected
Prescription
History
Reset
Save
Send
Current Device
Model: ICON™ Auto
Serial: 100312003038
Connected Status: Connected!
Supported Prescriptions:
Auto
CPAP
Activate
Fixed
Set Pressure 10 4 20
Humidity Setting 4 0 7
Boost Setting 2 1 3
Adv. Patient Display
Auto Mode
Timezone 13:21 GMT+12:00
Mask --- None ---
Activate
Auto
Minimum Set Pressure 4 4 20
Maximum Set Pressure 18 4 20
Apnea Cap 10 4 20
Humidity Setting 4 0 7
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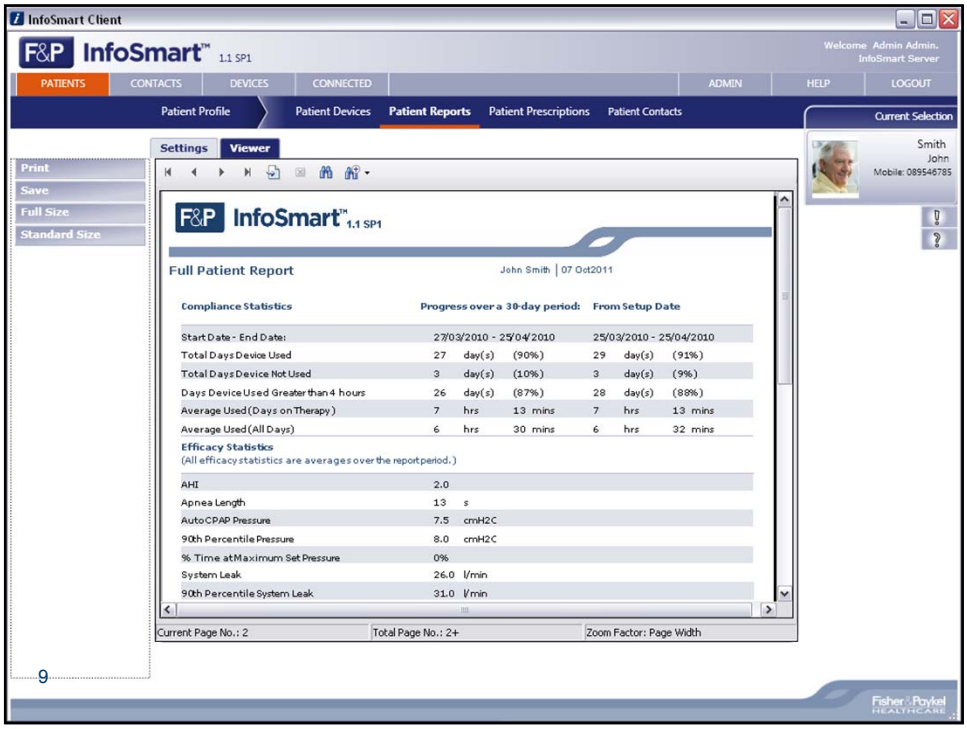

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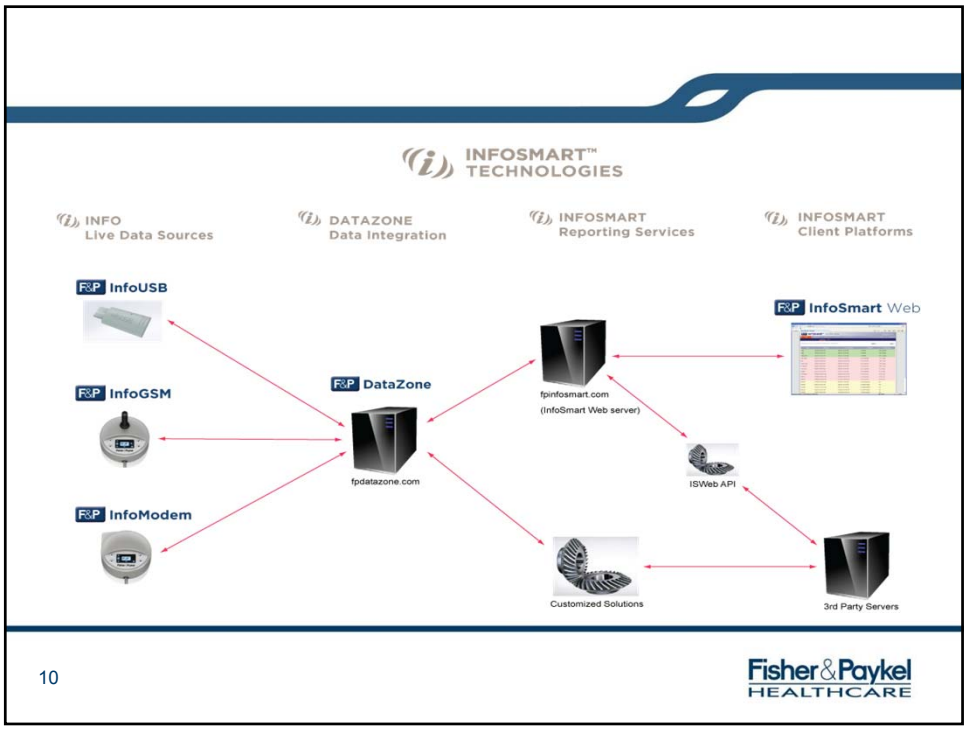

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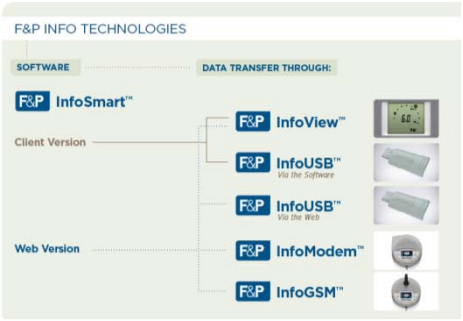
F&P Info Technologies

Summary

- Designed to simplify data transfer and monitoring to keep business efficient and profitable
- Provide flexible data solutions



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ICON™

The F&P ICON includes:

- ThermoSmart™ Technology for more humidity and comfort
- Contemporary, stylish design for bedroom appeal
- Forward facing clock with customizable AlarmTunes™
- Compact footprint including humidifier and power supply
- Info Technologies™ for flexible data communication options

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SensAwake

SensAwake™

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Benefits of SensAwake

SensAwake Lowest Waking Pressure

- SensAwake pressure relief promptly reduces the pressure to the lowest most comfortable level as the patient wakes with the aim of:
  - Removing pressure awareness
  - Reducing conscious waking
  - Accelerating the return to sleep

Removing pressure awareness

Reduced conscious waking

Accelerated return to sleep

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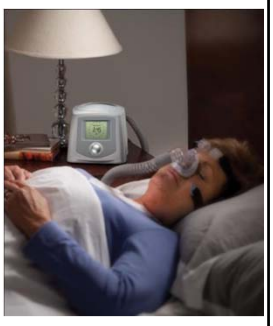
Benefits of SensAwake

Can less CPAP be more helpful?

- CPAP patients arouse from sleep up to 20 times/hr[1]
  - Arousal can lead to full awakening
- During awake states, patients can become intolerant of delivered pressure
  - They often then abandon CPAP for the night
- The intuitive response is to reduce pressure quickly upon wakefulness



[1] McArdle et al 2010

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Benefits of SensAwake

Automatic Ramp

- Ramp is routinely activated by patients to enhance comfort by lowering pressure
- SensAwake automatically lowers the pressure upon sensing patient wakening
- Its responsiveness lets the patient comfortably transition back to sleep

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How does SensAwake Work?

How does it work?

- Monitors patients breathing
- Senses the onset of awake breathing
- Lowers the pressure to the lowest most comfortable level
- Once sleep is resumed, pressure increases

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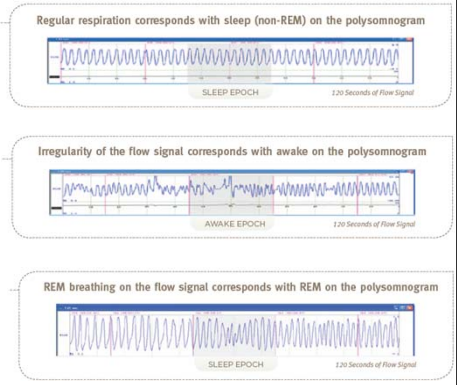
How does SensAwake Work?

Airflow Signal on the PSG

- Regular breathing pattern during relaxed sleep
- Irregular breathing during transition from sleep to awake
- Irregularity during REM breathing does not display the same traits as the irregularity during awake breathing



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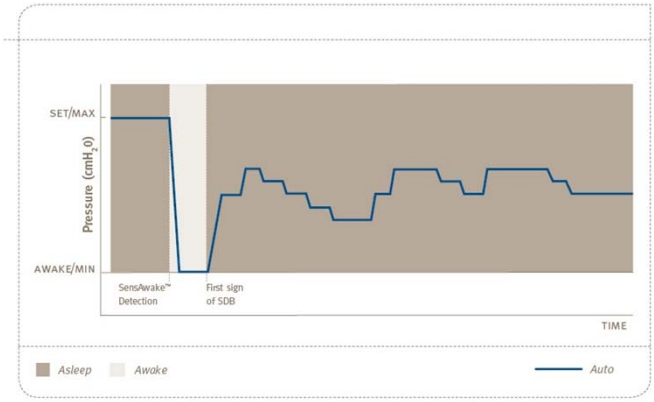
How does SensAwake Work?

SensAwake in Auto



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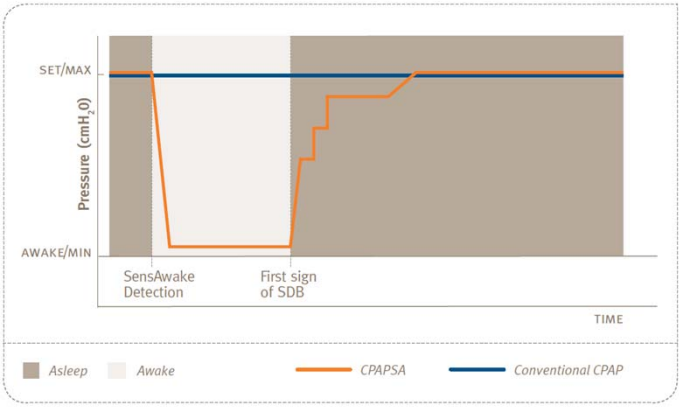
How does SensAwake Work?

SensAwake in Premo



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SensAwake Efficacy

Clinical Studies have shown

- SensAwake™ accurately detects the transition from sleep to wake using the flow signal alone[1]
- AutoCPAP devices with SensAwake™ treat OSA as effectively and at a lower overall mean pressure than a traditional AutoCPAP[2]
- CPAP devices with SensAwake™ treat OSA as effectively as conventional CPAP[3]
- Patients prefer CPAP with SensAwake to conventional CPAP[3-4]

[1]Ayappa et al 2009; [2]Dungan et al 2011; [3]Cumin et al 2011; [4]Powell et al 2011

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SensAwake Efficacy

Proven to Treat

- Delivering more awake comfort does not compromise therapy efficacy
- Despite the fact that pressures are lower than conventional therapy, the efficacy of the devices has been shown[1-3]
- Both Auto and Premo[2] devices have been validated in a clinical trials and AHI's are comparative
  - The long-term use of the Premo has been tested in a 150 patient trial[3]

[1]Dungan 2011; [2]Cumin 2011; [3]Powell 2011

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F&P SensAwake

- SensAwake pressure relief promptly reduces the pressure to the lowest most comfortable level as the patient wakes with the aim of:
  - Removing pressure awareness
  - Reducing conscious waking
  - Accelerating the return to sleep
- Efficacy of the devices with SensAwake to treat OSA is proven
- Now available in the Auto and Premo devices

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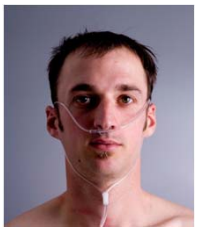
The Care Continuum

MORE CRITICAL ← → **LESS CRITICAL**



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The Care Continuum

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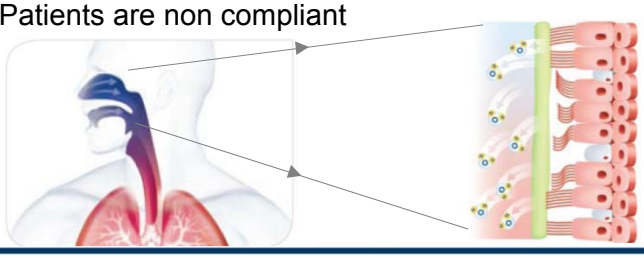
Higher Flows of Air/Oxygen Delivered Comfortably

The combination of optimal humidity with nasal cannula enables comfortable delivery of high flows

- Without Optimal Humidity
  - Tolerating high flows delivered directly into the nares would be impossible
  - Significant drying of the upper airway can occur
  - Patients are non compliant



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Optiflow

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Optiflow: AIRVO / MyAirvo

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Delivering Optiflow

F&P Optiflow Nasal Cannula

- Wide bore cannulae designed to deliver high flows without gas jetting
- Ergonomically designed for exceptional comfort around the nasal septum
- Lightweight and flexible
- Mobile condensate is reduced by the unique breathable film delivery tube
- Lanyard with quick release takes the weight of the circuit

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Optiflow Benefits

- Clinical benefits → better outcomes
  - Fewer escalations of therapy
  - Shorter hospital stay
  - Lower costs

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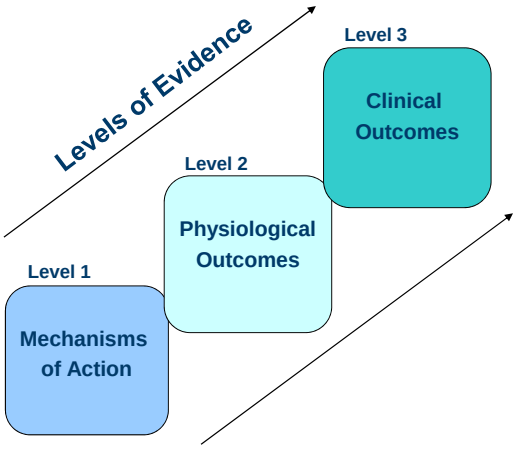
Optiflow Benefits



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Mechanisms of Action

1. Comfort
2. Deliver up to 100% oxygen accurately
3. Flushing of anatomical deadspace
4. Positive airway pressure during the respiratory cycle
5. Optimised mucociliary clearance

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Mechanisms of Action: Comfort

Comfortable, effective oxygen delivery

- Roca *et al,* Respiratory Care 2010
- Conclusions**:**
  - More comfortable than face mask oxygen therapy
  - Less mouth dryness

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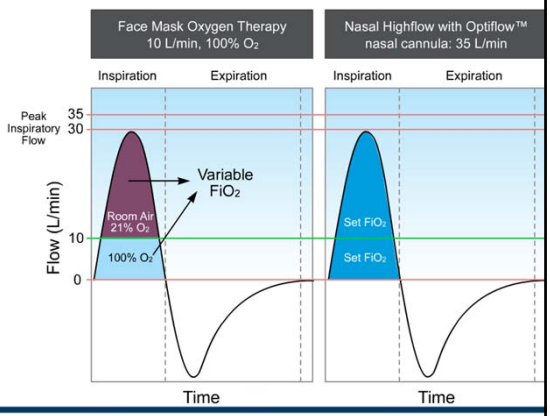
Mechanisms of Action: Accuracy

- With Nasal High Flow we aim to meet the patient's inspiratory demand with flow
- This enables the delivery of a set FiO_2, even when a patients respiratory mechanics change



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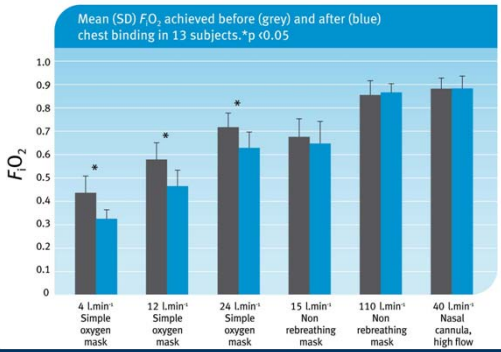
Mechanisms of Action: Accuracy

- When compared to face mask oxygen therapy, Sim et al demonstrated that to deliver greater than 85% FiO_2, a flow of 110 L/min is required for a face mask compared to 40 L/min with a nasal cannula



Adapted from Sim et al, 2008

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Mechanisms of Action: Flushing of Anatomical Deadspace

- Continuous flushing of the upper airway (anatomical deadspace)
- Washout is caused by the continuous delivery of high flows

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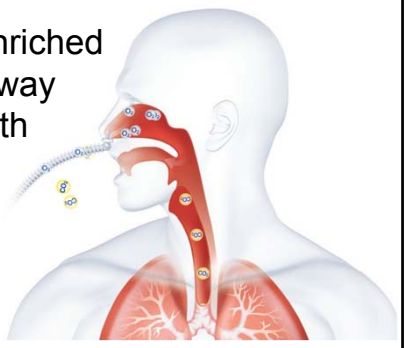
Mechanisms of Action: Flushing of Anatomical Deadspace

There are two key benefits of this flushing effect:

- Reduces re-breathing of expired CO_2
- A reservoir of fresh, oxygen enriched gas is created in the upper airway ready for each and every breath
- This may assist in more efficient gas exchange



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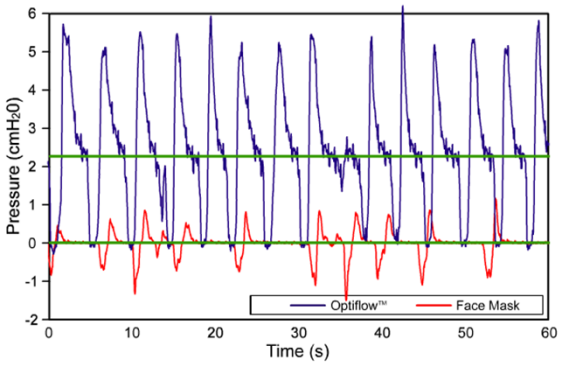
Mechanisms of Action: Positive Airway Pressure

- Parke *et al* compared nasopharyngeal airway pressures with NHF and face mask oxygen therapy with mouth open and mouth closed



Adapted from
Parke et al, 2008

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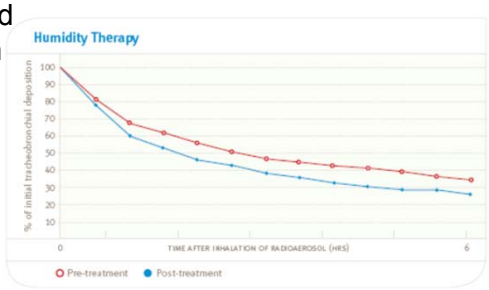
Mechanisms of Action: Mucociliary Clearance

- Hasani et al used a radio-aerosol technique to measure mucociliary clearance before and after 7 days of domiciliary humidification
- Delivered optimally humidified flow of 20 – 25 L/min through nasal cannula for 3hrs each day
- Following humidification mucociliary clearance significantly improved



Adapted from
Hasani et al, 2008

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Physiological Outcomes

- Roca et al (Acute respiratory failure) found:
  - Less dyspnoea
  - Improved oxygenation
  - Reduced respiratory rate
  - No change in PaCO2
- Corley *et al*, Prince Charles Hospital, Critical Care Research Group, Queensland (using EIT on 20 post operative cardiac surgical patients) found:
  - Increased airway pressure
  - Increased end expiratory lung volume
  - Increased tidal volume
  - Improved oxygenation
  - Decreased respiratory rate
  - Subjectively assisted ease of breathing

Clinical Outcomes: NIV

- Parke et al, CVICU, Auckland City Hospital
- 60 patients with moderate hypoxemia were randomised to receive either nasal high flow or humidified high flow face mask oxygen therapy
- Compared with high flow face masks nasal high flow was associated with:
  - Improved therapy success
  - Fewer episodes of desaturation over time
- The rate of NIV in the nasal high flow group was 3/29 (10%) compared with 8/27 (30%) in the high flow face mask group

Clinical Outcomes: Exacerbations

- Rea et al 2010, Respiratory Medicine
- 108 patients diagnosed with COPD or bronchiectasis
- Daily humidification therapy 12 months
- Usual care for 12months
- Measured outcomes:
  - Exacerbation rates
  - Lung function spirometry
  - quality of life
  - exercise capacity exercise capacity
  - measures of airway inflammation recorded at baseline, 3 and 12 months

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Clinical Outcomes: Exacerbations

- Results:
  - Decreased exacerbation days (-44%)
  - Increased days to first exacerbation (57 vs. 27)
  - Decreased antibiotic use (22.8% vs 38.5% of days)
  - Compliance: 41/53 of patients (77%) chose to continue with humidification post 12 month study

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Patient Profiles

Categories	Conditions	Symptoms
Airway disease	Bronchitis Asthma Emphysema	Obstructed airways limit airflow and ventilation. Secretion quantity and quality leads to mucus plugging and obstruction
Diffuse lung disease	Pulmonary Fibrosis Pneumoconiosis	Reduced lung compliance and lung volumes: reduced FRC
Infective pulmonary disease	Pneumonia	Secretion quantity and quality leads to mucus plugging and obstruction
Disorders of lung inflation	Atelectasis	Collapse of alveoli reduces lung surface area for gas exchange

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The Care Continuum

MORE CRITICAL ← → **LESS CRITICAL**




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