Connex® Vital Signs Monitor (CVSM)
2.3X/2.4X Software Version

Clinical In-Service Presentation
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* Requires connectivity

For Spot workflow see slides 14-44
Device Overview & Intended Use

Use to obtain vital signs and other parameters

- Adults (>12 yrs)*
- Pediatric (29 days-12 yrs)*
- Neonate (<28 days)*

**Note:** To change patient type, touch Patient tab and select Patient Type (i.e. age) from the drop-down list.

*Does not apply to Integrated Pulmonary Index (IPI)™, Acoustic Respiratory Rate (RRa®), ECG or EarlySense®*
Mobile Stand

- Roll-stand handle and night light
- $\text{SpO}_2$ cable wrap
- Probe cover storage
- Supply cubbies
- Cleaning wipes holder

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Power On

Press Power Button
Home Screen

Divided into three sections:

- **Device Status Area**
  - NIBP: 103/72 mmHg (MAP 82)
  - Pulse Rate: 86 bpm
  - SpO₂: 98% (PI 4.1)
  - Temperature: 98.5°F

- **Content Area**
  - Patient: Jefferson, Tom
  - Height: 1 in
  - Weight: 22 lb
  - Pain: 1
  - RR: 22 BPM

- **Navigation Area**
  - Home
  - Patients
  - Review
  - Settings
Home Screen: Device Status Area

Provides device status information, including:

- Clinician ID*
- Device location* (i.e. nursing unit)
- Date & time
- Connection status* (i.e. Ethernet, Wireless, USB, or Bluetooth®)
- Profile selection (i.e. Spot, Intervals, Continuous)
- Battery status
- Alarms and messages

* If applicable – connectivity required
Home Screen: Content Area

Displays:

- **Patient information** (if applicable)
- Vital signs
- **Custom modifiers** (if applicable)
- **Manual parameters** (if applicable)
- **Custom scoring** (if applicable)
- Clear and Save buttons
Home Screen: Navigation Area

Displays:

- Navigation tabs for a variety of information

**Note:** Available tabs depend on which profile is selected (see following slides for more information about profiles)
Profiles: Spot Check

Features:

- No alarms
- No BP intervals
- **Custom scoring** (if applicable)
- **Modifiers and manual parameters** (if applicable)

**Note:** Take SpO$_2$ sensor **OFF** prior to saving readings
Profiles: Office

Features:

- Optimized for ambulatory workflow
- **Blood pressure averaging**
  - Record patient’s average blood pressure readings over set period of time
  - Programs customizable by facility
- Manually enter pain, height, weight, and calculate BMI

**Note:** Take SpO$_2$ sensor OFF prior to saving readings
Profiles: Intervals Monitoring

Features:

- **Interval BPs**
- **Parameter** alarms
- **Custom scoring** (if applicable)
- **Modifiers and manual parameters** (if applicable)

**Note**: SpO\textsubscript{2} sensor stays **ON** when touching **SAVE**
Profiles: Continuous Monitoring

Features:

• Continuously monitor vital signs and other parameters

• Pause option during monitoring

• Minute-by-minute data review of current patient (list or graphical view)

Note: if applicable to your facility
Profiles: Switching Profiles

To change Profiles:

1. **Touch current profile** shown in Device Status Area

2. **Choose desired profile**
   - Your choices may include:
     - Spot Check
     - Intervals Monitoring
     - Continuous
     - Office

**Note:** If profile **changed** from Spot/Intervals/Office to Continuous, or vice versa, device will remind user that all vitals in Review tab **will be deleted**.

**Note:** Available profiles depend on facility’s chosen settings
Connectivity Symbols

Ensure connectivity symbol present **BEFORE** signing in and scanning patient barcode
Clinician Sign-In

To sign in using clinician symbol:

1. Touch clinician symbol
Clinician Sign-In

To sign in using clinician symbol:

1. Touch clinician symbol

2. **Scan clinician ID** using barcode scanner or **touch clinician ID box** to manually enter ID and password (if applicable)

3. **Touch OK** to return to Home screen

- Clinician ID will appear next to clinician symbol once clinician successfully signed in
- Clinician ID **may be required** to save/send vitals
- Clinican cache available (if applicable) to store log-in information for last 5 clinicians.
  - Facilitates quicker repeated logins
Patient Identification

Identify patient **before** taking vital signs (VS):
- **Scan patient’s armband** from Home screen
- Patient name/ID appears in patient ID section of **Content Area**. Visually verify patient information (Settings may vary)

Patient ID may be **required** to save/send VS
Patient Summary Menu

1. To change Patient Type (age range):
   a. Touch patient type button
   b. Select appropriate patient age
   c. Press OK to return to Home

2. To clear patient information (alternative to using Clear button):
   a. Touch age range button
   b. Touch Clear
   c. Touch OK to return to Home

Note: if barcode scanning, do not use Patient Summary menu to edit any patient-identifying information (ie. Name, ID, Room)
Non-Invasive Blood Pressure (NIBP): Start/Stop

**Start NIBP:**
Touch START to initiate BP

**Stop NIBP:**
Touch STOP to cancel BP in progress
NIBP: Results

a. **Touch NIBP cell** to toggle between SYS/DIA reading and MAP

b. Static (one-time) pulse rate generated from cuff’s BP reading unless **SpO2** probe used on patient
   - Displays **SOURCE: NIBP**
NIBP: Technology

With a **two-lumen BP hose**, the CVSM utilizes SureBP® technology

SureBP® captures BP on cuff **inflation**

- Reading takes approx. 15 seconds!
- Reverts to step deflation method (BP on cuff deflation):
  - In times of extreme movement
  - Artifact or a moderate-severe arrhythmia
  - Neonate mode
  - If programmed to do so via Advanced Settings
NIBP: Proper Technique

- Allow patient to sit quietly for a few minutes
- Cuff on bare arm
- Back supported, legs uncrossed
- Align artery index marker with brachial artery
- Arm supported at heart level
- Properly sized cuff
- Patient sitting quietly and not moving
- No more than two fingers between cuff and arm

If using Welch Allyn FlexiPort® cuff, place port to outside of patient’s body

For more information on Blood Pressure technique, go to: https://www.youtube.com/watch?v=ScbFRb1dKc4&index=21&list=PLkXnwokwhxrU8d-LnfwYy2Lsjza2z7kX
Pulse Oximetry (SpO₂) and Pulse Rate (PR)

Place pulse ox on patient’s finger to obtain SpO₂ and PR

- Pulse rate derived from pulse ox when in use
  - Displays SOURCE: SpO₂

Touch SpO₂ tile to toggle between large number reading and pleth waveform
To obtain most accurate SpO$_2$ and PR, ensure:

- **Clean** sensor (use alcohol pad)
- Warm, **perfused** extremity
- No nail polish or artificial nails
- Placement on **opposite extremity** of NIBP cuff

When not in use, place pulse ox **back in holster**
Temperature

Home Screen displays:
- Temperature in facility’s chosen unit of measure
- Converted temperature underneath (if applicable)
- Method used to obtain temperature
Temperature: Probe Covers

Only use covers designed specifically for Welch Allyn/Braun thermometers

- Using other brands or types can cause damage and/or inaccurate readings

All probe covers are single use only
Temperature: Braun ThermoScan® Pro 6000 Technique

Remove thermometer from cradle

Push probe tip into box to apply new probe cover

Wait for ready light and beep

Place probe snugly in ear canal

Direct probe at opposite temple

Press and release Measure button

Long beep and steady green ExacTemp™ light signal end

Press probe cover ejector button to remove cover
Temperature: Braun Interferences

The following external factors **may** influence ear temperatures:
- Used probe cover
- Wet/dirty/damaged lens
- Lying on a pillow
- Hearing aid*

The following external factors **DO NOT** influence ear temperatures:
- Ambient temperature
- Moderate cerumen (ear wax)
- Otitis media (ear infection)
- Tympanostomy tubes

For persons wearing **hearing aids** or in **extreme ambient temperatures**, remove the hearing aid or the individual from the situation and **wait 20 minutes** prior to taking a temperature.
Temperature: Braun Contraindications and Tips

The following are contraindications to the use of tympanic thermometry:

- Patient exhibiting symptoms of chronic or acute inflammatory condition of external ear canal
- Certain facial or ear deformities
- Blood/drainage in external ear canal

Use untreated ear if ear drops/medications have been placed in ear canal.

Complete ear canal occlusion due to cerumen (ear wax) can result in lower temperature readings.
Temperature: SureTemp® Plus Oral

**Oral Temperatures:**

1. Pull probe from well, **apply** **Welch Allyn probe cover**
2. Ensure **oral mode** displayed
3. Place probe in **sublingual pocket**
4. Thermometer beeps when reading complete **(4-6 sec)**
5. **Press top of probe** to release cover, then return probe to well
Temperature: SureTemp® Plus Oral Interferences

The following interfere with obtaining an accurate oral temperature for at least 20 minutes:

<table>
<thead>
<tr>
<th>Eating food</th>
<th>Chewing gum or mints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingesting hot or cold liquids</td>
<td>Brushing teeth/mouth care</td>
</tr>
<tr>
<td>Smoking</td>
<td>Performing strenuous activity</td>
</tr>
</tbody>
</table>
Temperature: SureTemp® Plus Pediatric Axillary

Peds Axillary Temperature: (for patients 17 years or less)

1. Pull probe from well, apply Welch Allyn probe cover

2. Press mode once to select peds axillary

3. Place probe vertically in axilla against bare skin
   • Think: “Align with the spine”

4. Thermometer will beep when reading complete (10-15 sec)

5. Press top of probe to release cover, then return probe to well
Temperature: SureTemp® Plus Adult Axillary

**Adult Axillary Temperature:**
(for patients 18 years and older)

1. Pull probe from well, **apply** Welch Allyn probe cover

2. **Press mode twice** for adult axillary

3. Place probe **vertically** in axilla against **bare skin**
   - Think: “**Align with the spine**”

4. Thermometer will beep when reading complete **(12-15 sec)**

5. **Press top of probe** to release cover, then return probe to well
Rectal Temperature:

1. Insert red probe and well into device
2. Pull probe from well, **apply Welch Allyn probe cover**
3. If needed, **apply small amount** of lubrication
4. **WARNING** Patient injury risk. Insert probe tip **maximum 5/8 inch** (approximately 1.5 cm) inside rectum of adults and **maximum 3/8 inch** (approximately 1 cm) inside rectum of peds to avoid the risk of bowel perforation.
5. Thermometer will beep when reading **complete (10-15 sec)**
6. **Press top of probe** to release cover, then return probe to well
Manual Parameters and Custom Modifiers

- **Additional assessment information** clinicians can enter to send into the medical record with VS taken
- Customizable by facility: options depend on facility’s selections
- Ex. Height, weight, intake, output, respiratory rate, patient position

To enter Manual Parameters/Custom Modifiers in any profile:

1. Touch Manual Parameters box
Manual Parameters and Custom Modifiers

- **Additional assessment information** clinicians can enter to send into the medical record with VS taken
- Customizable by facility: options depend on facility’s selections
- Ex. Height, weight, intake, output, respiratory rate, patient position

To enter Manual Parameters/Custom Modifiers in any profile:

1. Touch Manual Parameters box
2. Touch any box to (a) type in value with keypad or (b) select from dropdown menu.
3. Press OK to confirm entries and return to Home screen
Custom Scoring

- Provides numeric and/or color-coded scoring for individual parameters, a total score of all included parameters, and required response text based on individual or total scores (if applicable)
- 100% customizable by facility, so features will vary
- Score generated at bedside for quickest clinical action

**Example:**
- Custom scoring protocol named EWS (Early Warning Score)
- Total score includes respiration rate, systolic BP, temperature, pulse rate, and level of consciousness
- Individual scores, required response, and total score listed on summary screen

**Note:** Only available in Spot Check and Intervals Monitoring profiles
Custom Scoring: Types

**Note:** ALL included parameters must have results to calculate aggregate score or aggregate with single parameter trigger

**Aggregate Scoring**
- Scores all parameters included in selected scoring protocol
- Ex. Uses respiration rate, pulse rate, systolic blood pressure, level of consciousness (LOC), and temperature to obtain aggregate score of 7

**Aggregate Scoring with Single Parameter Trigger**
- If one parameter is elevated, but all others are within normal limits, elevated parameter will trigger specific required response and elevated score color indication
- Ex. Shows only LOC elevated. Aggregate score is normal, but single parameter trigger prompts clinician to act on high LOC score
Manual Override

To manually override a VS (in any profile):

- **Press and hold** inside that tile to bring up keypad, type in new value, press OK
  - Ex. Manually auscultated BP
  - Will display SOURCE: **Manual**
  - Denoted by asterisk (*) in **Review tab**.
Saving/Clearing Vital Signs (Connected)

Home screen now displays:

- All vital signs (VS) taken
- Custom modifiers (if applicable)
- Manual parameters (if applicable)
- Custom scoring (if applicable)

- To clear all VS from screen, save to device’s Review tab (if applicable), and send to Electronic Medical Record (EMR) press Save.

- To clear all VS without saving/sending, press Clear.
Review Tab: List View (Connected)

- Review tab holds **400 sets of saved vitals** for up to **24 hours**
- Once successfully sent, either an **envelope appears** next to name OR **readings cleared** from review tab (depending on facility’s chosen settings)
- Patient name or ID number displays under Patient column (depending on facility’s chosen settings)
When connected to EMR, if VS not sent successfully (no envelope next to name/ID)

a. Select the set of VS (place a check in the adjacent box)
b. Press Send, then OK to confirm (envelope will appear next to it when sent successfully)
c. OR to delete set of VS, select and press Delete

Press OK to clear “Save successful” message
Saving/Clearing Vital Signs (Non-Connected)

Home screen now displays:

- All vital signs (VS) taken
- **Custom Scoring** (if applicable)

**To clear all VS** from screen and save to device’s **Review tab** press **Save**.

**To clear all VS** without saving, press **Clear**.
**Review Tab: List View (Non-Connected)**

- Review Tab holds **400 sets of saved VS** for up to **24 hours**
  - Must have pressed “Save” on Home screen to see VS here

- To **delete** a set of VS, select and **press Delete**

- **Press OK** to clear “Save successful” message
Clinician Sign-Out

To sign clinician out:
1. Touch Clinician symbol to open Clinician menu
2. Touch Clear
3. Touch OK

Note: Powering down CVSM will also clear clinician ID
Office Profile: Blood Pressure Averaging

Initiating BP averaging:

1. Touch

Note: Device must be in **Office Profile** to use BP averaging
Office Profile: Blood Pressure Averaging

Initiating BP averaging:

1. Touch

2. Choose desired program and review protocol

3. Touch Start intervals button

Note: Device must be in Office Profile to use BP averaging
Office Profile: Blood Pressure Averaging

After pressing Start Intervals:

- First BP starts immediately
- Intervals symbol now displays **count-down** until next scheduled NIBP
- Automatically collected BPs displayed in BP frame and in Review tab

To Stop Intervals, touch **Stop Intervals** button, then touch **Stop Intervals** button
Intervals Workflow: Start Intervals (Connected)

1. Ensure **connectivity symbol** is present

2. **Touch clinician symbol** and **sign in** (if applicable)

3. **Scan patient barcode**

**Note:** Clinician and/or patient ID may be required to start interval blood pressures
Intervals Workflow: Start Intervals

**Initiating Interval BPs:**

1. **Touch**

   - Device must be in *Intervals Profile* to use interval BP
   - Stat takes as many BPs as possible in 5 minutes (allows for return of circulation)
   - See following slides for detailed instructions on adjusting intervals
Intervals Workflow: Start Intervals

Initiating Interval BPs:

1. Touch

2. Choose automatic, program, or STAT

3. Adjust intervals as desired

4. Touch Start intervals button

- Device must be in Intervals Profile to use interval BP
- Stat takes as many BPs as possible in 5 minutes (allows for return of circulation)
- See following slides for detailed instructions on adjusting intervals
Intervals Workflow: Start Intervals

After pressing Start Intervals:

- First BP starts immediately

- Intervals symbol now displays count-down until next scheduled NIBP

- Automatically acquired VS collect in Review Tab

- Taking extra sets of vitals does not alter intervals schedule
  - Must press Save to chart extra sets of VS

To Stop Intervals, touch Stop Intervals button
Intervals Workflow: Automatic

- **Takes NIBP automatically at set frequency**
  - Frequency ranges from 1 – 240 minutes

- **To set frequency:**
  - **Touch white tile** to use keypad, or touch **arrows**

- **Note:** Any box with a number in it can be pressed to bring up a keypad
Intervals Workflow: Program

Takes NIBP automatically based on protocols at your facility

- Up to 6 programs can be customized
  - Clinician may not be able to edit programs, depending on facility’s chosen settings

To begin:
- Set up new Interval Program (if applicable) or choose existing program
Intervals Workflow: Program

For new Interval Program:
1. Touch any program (ex. Transfusion)
2. Touch interval to set frequency (ex. q5min/every 5 minutes)
3. Touch frequency to enter Duration using keypad (ex. x10)
4. Repeat with lines 2-5 as needed
5. Touch title of program to rename

Ex. Post Op
q 15 min x 4, then q 30 min x 2, then q 60 min x 6

Note: Program will end after q60x6

Takes NIBP automatically based on protocols at your facility
- Up to 6 programs can be customized
  - Clinician may not be able to edit programs, depending on facility’s chosen settings

To begin:
Set up new Interval Program (if applicable) or choose existing program
Adjusting alarms:
1. Touch **bell** in desired parameter tile

Higher and lower alarm parameters displayed on Home screen in **Intervals** and **Continuous profiles** only.
Intervals: Adjusting Alarms

Adjusting alarms:

1. Touch bell in desired parameter tile

2. **Touch number to be changed** and type in desired alarm limit, then press OK
   - Arrows may also be used to make incremental changes

3. **Touch** to turn on/off alarm*
   - While off, no visual or audible alarm signals will occur for that parameter

4. **Press Home tab** when complete to return to Home screen and confirm changes

Higher and lower alarm parameters displayed on Home screen in **Intervals** and **Continuous profiles** only.

*Note: Ability to turn on/off alarms dependent upon facility’s chosen settings
Intervals Workflow: Silencing Alarms

To silence an alarm:

• **Touch the triangle** once or **touch highlighted parameter** to silence for one minute (or twice for two minutes)

• Alarm will disappear when patient condition resolved or alarm limit adjusted accordingly
Intervals Workflow: Review and Manage Vitals (Non-Connected)

Managing Review tab:

1. **Touch Review tab**

2. **Select VS** to remove by touching adjacent boxes

3a. **Touch Print** to print sets (requires built-in printer)

3b. **Or press Delete** (instead of Print) to clear selected VS from Review tab

**Note:** It is not recommended that the Review tab be used to reference vital signs of different patients, as no patient identifier is present.
Intervals Workflow: Review and Manage Vitals (Connected)

Managing Review tab:

1. **Touch Review tab**

2. **Select vitals** to send by touching adjacent boxes

3a. **Touch Send**, then OK to confirm*

3b. **Or press Delete** (instead of Send) to clear selected VS from Review tab

4. **Envelope** will appear next to successfully sent VS*

* Depending on chosen settings, if readings sent successfully, **envelope will appear** next to vitals and remain 24 hours **OR readings will be cleared** from Review tab.

**Note:** only VS without envelope can be sent
Continuous Monitoring Screens

RRa® tile

etCO₂ tile

EarlySense® tile

ECG tile
Continuous: Workflow (Connected)

1. Ensure **connectivity symbol** is present

2. Touch Clinician **symbol** and **sign in** (if applicable)

3. **Scan patient barcode**

- Clinician and/or patient ID **required** to send continuous vitals to EMR. Your facility will provide instructions for charting VS.

- Clinician and Patient IDs **remain** until monitoring ended and clinician has signed out. See **clinician sign-out**, and **switching clinicians** for more information.
Continuous: Workflow (Connected)

4. **Acquire desired** VS (NIBP & Temp) and/or **apply desired continuous monitoring accessories** (etCO2 sampling line, pulse ox, EarlySense® sensor, RRa® sensor, ECG leads)

5. **Enter Manual Parameters/Modifiers** (if applicable)

6. VS will record automatically in **Review tab**

- **Press STOP** to temporarily **pause that specific parameter’s monitoring only**, but continue monitoring all other parameters. Reapply sensor/accessory and **press Resume** (same place as STOP) to continue monitoring

- Your facility will provide instructions to pull VS into patient’s chart

**Note:** Workflow applies to **ALL** continuous monitoring. End-tidal used as example.
Continuous: Workflow (Non-Connected)

1. **Acquire desired VS (NIBP & Temp) and/or apply desired continuous monitoring accessories**
   - Ex. etCO₂ sampling line, pulse ox, EarlySense® sensor, RRa® sensor, ECG leads

2. Vitals will automatically record in **Review tab**

- **Press STOP** to temporarily **pause that specific parameter’s monitoring only**, but continue monitoring all other parameters. Reapply sensor/accessory and **press Resume** (same place as STOP) to continue monitoring
Continuous: Review Tab Trend Table

<table>
<thead>
<tr>
<th>Barker, David</th>
<th>13:32</th>
<th>13:33</th>
<th>13:34</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIBP mmHg</td>
<td>109/70</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>SpO2 %</td>
<td>??</td>
<td>96</td>
<td>97</td>
</tr>
<tr>
<td>HR/PR bpm</td>
<td>86</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>TEMPERATURE °C</td>
<td>36.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RR BPM</td>
<td>14*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WEIGHT lb</td>
<td>120.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **a. Touch Review tab** to access trend table of all readings for current patient
- **b. Touch View** drop down menu to configure time interval displayed (Ex. See vitals q1hr vs. q15min)
- **c. Scroll through last 24 hours** of patient measurements
Continuous: Review Tab Graphical Review

- Touch Review tab to access trend table of all readings for current patient.
- Touch View drop down menu to configure time interval displayed (Ex. See vitals q1hr vs. q15min).
- Scroll through last 24 hours of patient measurements.
- Touch graph symbol to view graphical trends. Plots VS on graph to visualize trending.
- Touch Home tab to return to Home screen.

**Note:** ECG snapshots only visible in single-patient view (if applicable).
Continuous Monitoring: Graphical View

- Graphical review shows visual trend of vitals over time
- **Note**: (if applicable) ECG snapshots not viewable from graphical review
**Continuous: Pause/End Monitoring**

**To Pause or End Monitoring:**
1. **Touch Pause** (before removing accessories)
   - Useful when patient out of bed
Continuous: Pause/End Monitoring

To Pause or End Monitoring:
1. **Touch Pause**
   - Useful when patient out of bed
2. **Disconnect accessories from patient. Touch +**
   - to increase pause time (max 4 hrs)
3. **Reattach accessories and touch Resume monitoring**
4. **OR touch End monitoring**
   - to discontinue monitoring
Continuous: Pause/End Monitoring

To Pause or End Monitoring:
1. **Touch Pause**
   - Useful when patient out of bed
2. **Disconnect accessories from patient**. **Touch +** to increase pause time (max 4 hrs)
3. **Reattach accessories** and **touch Resume Monitoring** to return to monitoring patient
4. **OR touch End Monitoring** to discontinue monitoring
   - Choose **New patient** (device will stay on and clear all data from current patient) or **Power down** (device will power off)
Continuous: End-Tidal Carbon Dioxide (etCO$_2$)

- Proprietary technology **reduces** unnecessary alarms
- Provides **Integrated Pulmonary Index** (IPI) if enabled by facility

To use:
1. Connect sensor to monitor and turn gently, but firmly, to the right, place sensor line on patient, acknowledge connection message (if applicable) to begin monitoring
2. To see waveform touch etCO$_2$ tile: Touch again to return to numeric view:

**Note:** Nafion® prolongs life of filter line. **Do not** put tape or adhesive over it
Continuous: Medtronic Microstream™ etCO₂ Integrated Pulmonary Index (IPI)

- **Optional** Oridion module provides clinician with an Integrated Pulmonary Index™ (IPI)
- Displays single value representing patient's pulmonary parameters. Alerts clinicians to changes in patient's pulmonary status
- Incorporates current end tidal CO₂ (etCO₂), respiratory rate, pulse oximetry (SpO₂) and pulse rate, into a single number representing respiratory profile
  - All 4 parameters simultaneously required
  - Displayed on scale of 10 - 1

**Age Ranges to select from for IPI:**
- 1-3 years old
- 3-6 years old
- 6-12 years old
- 13+ years old

<table>
<thead>
<tr>
<th>IPI</th>
<th>Patient Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Normal</td>
</tr>
<tr>
<td>8-9</td>
<td>Within normal range</td>
</tr>
<tr>
<td>7</td>
<td>Close to normal range; requires attention</td>
</tr>
<tr>
<td>5-6</td>
<td>Requires attention and may require intervention</td>
</tr>
<tr>
<td>3-4</td>
<td>Requires intervention</td>
</tr>
<tr>
<td>1-2</td>
<td>Requires immediate intervention</td>
</tr>
</tbody>
</table>
Continuous: Masimo® Acoustic Respirations (RRa®)

- Requires simultaneous Masimo SpO₂ and RRa® sensor use
- Provides respiratory rate via acoustic sensor

**Note:** Only for adults weighing more than 66 lbs

To set up:
1. **Place** SpO₂ and RRa® sensors on patient (see next slide for instructions)
2. Plug both into adapter and **connect to Masimo® port** on CVSM
Continuous: Masimo RRa® Sensor Placement

Applying sensor to patient’s neck

Preferred site = either side of larynx below jaw line

Clean site with alcohol, remove hair, and ensure area is dry

Place fingers adjacent to trachea and have them verbalize “99”. Locate where best vibration felt.

Adhere to patient’s skin and secure sensor to patient shoulder area (NOT clothing) via adhesive anchor

Initiate SpO\textsubscript{2} monitoring
## Continuous: EarlySense®

<table>
<thead>
<tr>
<th>Contact-free monitoring of:</th>
<th>Other features:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Movement</td>
<td>Turn indicator/reminder</td>
</tr>
<tr>
<td>Heart and Respiratory rates (with trending)</td>
<td>Fall prevention/bed exit alerts</td>
</tr>
</tbody>
</table>

**Note:** Only for children/adults weighing more than 22 lbs (10 kg)

### To use:

1. Place sensor under the mattress face up on bed frame under patient’s chest/shoulder blades
   - Placement varies patient-to-patient. **Recheck placement** after patient leaves/returns to bed

2. Connect cable to CVSM as shown
   - Allow approximately 1 min for pulse rate and 3 min for respiratory rate
Continuous: EarlySense® Tile

1. RR, PR, and Movement tile will display ?? or signal indicator while searching for vitals.
2. Movement measured as low (L), medium (M), high (H), and extra high (EH).
3. Bed exit alarm sensitivity scale from 1 (least sensitive) to 6 (most sensitive).
4. When set, turn indicator counts down until next scheduled turn with audible alert when turn due.
   - Press turn icon to log patient turn and reset counter.
Continuous: ECG

Displays ECG **waveforms**, **heart rate**, and **impedance respiration** (if applicable)

Uses **3 or 5 leads**

For adult and pediatric patients **10 kg (22 lbs) or more**

**Optional:**
- Pacemaker detection
- Arrhythmia detection
- Associated technical and physiological alarms

**Detectable arrhythmias:**

- Ventricular tachycardia (VTach)
- Ventricular fibrillation (VFib)
- Asystole
Cont. ECG: Module

Plugs into CVSM

Attaches to electrodes

3-Lead

5-Lead
Cont. ECG: Contraindications

- Infants weighing less than 10 Kg (22 lbs)
- Neonatal patients
- Direct cardiac application
- Transport monitoring

**Note:** NO automated ECG is completely reliable. Waveforms should be reviewed by a qualified physician before treatment, or non-treatment, of any patient.
Cont. ECG: Set-up

1. Switch to **Continuous** profile and touch **Settings tab**

2. Touch **Setup tab**

3. Touch **ECG tab**
Cont. ECG: Set Up

4. **Adjust settings** as desired:
   a. ECG Gain
   b. Sweep speed
   c. Filter (enable or disable)
   d. Impedance Respiration* (enable or disable)
   e. Use ECG as an RR source when available

5. **Set Pacemaker detection****
   (pacemaker spike markers) as needed

6. **Touch Home tab**

   *Note*: Impedance respiration monitoring only available in Lead II

   **Warning**: Enable pacemaker detection for all paced patients. Pacemaker pulse can be counted as a QRS, possibly resulting in incorrect heart rate and failure to detect cardiac arrest and some life-threatening arrhythmias (V-Tach, V-Fib, asystole)
## Cont. ECG: Attaching Leads

<table>
<thead>
<tr>
<th>Prepare patient</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain procedure</td>
<td>Remind patient to remain <strong>still</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prepare electrode locations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clean skin</strong>, lightly rub dry. Soap and water, alcohol swabs, skin prep pads suitable</td>
<td><strong>Shave</strong> and <strong>gently abrade</strong> electrode placement area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Confirm cable attached to ECG module</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Snap lead wire to each electrode <strong>before</strong> placing on patient</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Apply electrodes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow instructions for proper lead placement in following slides</td>
<td></td>
</tr>
</tbody>
</table>
Proper lead placement is important for a successful ECG. The most common ECG problems are caused by poor electrode contact and loose leads.
For patients on whom standard electrode placement is *inadequate* to detect impedance respiration:

**Change LL and RA electrode placement to mid-axillary line** on each side of the chest as shown above.
1. **Touch Start** in ECG frame to begin acquiring ECG waveform
   - Allow 3 to 5 seconds before waveform appears. Heart Rate also appears in ECG frame
   - For best quality signal, use **ConMed Cleartrace ECG electrodes**
   - To maintain quality of signals during long-term monitoring, replace electrodes **at least every 48 hours**
   - When replacing electrodes, do not position new electrodes on exact same locations, but a little **to the side of original position**
   - If patient defibrillated with ECG cables attached, replace cables
Cont. ECG: Monitoring

1. Touch **Start** in ECG frame to begin acquiring ECG waveform
   - Allow 3 to 5 seconds before waveform appears. Heart Rate also appears in ECG frame

2. **Touch waveform** to display different lead
   - Waveform and lead selection label change with each touch
   - Current lead selection highlighted in list of available leads

3. **Touch Stop** to pause ECG monitoring only
   - Ex. Patient up to toilet
   - Stop becomes Start button. Press to resume monitoring

**Notes:**
- For best quality signal, use **ConMed Cleartrace ECG electrodes**
- To maintain quality of signals during long-term monitoring, replace electrodes at least every 48 hours
- When replacing electrodes, do not position new electrodes on exact same locations, but a little to the side of original position
- If patient defibrillated with ECG cables attached, replace cables
## Cont. ECG: Alarms Summary

<table>
<thead>
<tr>
<th>Alarm condition</th>
<th>Alarm threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asystole</td>
<td>No detectable beat for $\geq 4$ seconds</td>
</tr>
<tr>
<td>Ventricular tachycardia</td>
<td>Default: 120 bpm $\pm 3$ bpm for 6 consecutive beats</td>
</tr>
<tr>
<td></td>
<td>Range: 100 to 150 bpm $\pm 3$ bpm for 6 consecutive beats</td>
</tr>
<tr>
<td>Ventricular fibrillation</td>
<td>Fibrillatory waveform persisting for $\geq 4$ seconds</td>
</tr>
<tr>
<td>Heart rate</td>
<td>Heart rate above high rate alarm or below low rate alarm threshold</td>
</tr>
<tr>
<td>Impedance respiration rate</td>
<td>Respiration rate above high rate or below low rate alarm threshold</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alarm limits</th>
<th>Upper limit range of entry</th>
<th>Lower limit range of entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventricular tachycardia</td>
<td>150 beats per minute</td>
<td>100 beats per minute</td>
</tr>
<tr>
<td>Heart rate</td>
<td>300 beats per minute</td>
<td>20 beats per minute</td>
</tr>
<tr>
<td>Impedance respiration rate</td>
<td>100 breaths per minute</td>
<td>5 breaths per minute</td>
</tr>
</tbody>
</table>
Waveform snapshots capture a **7-second strip**, to include the 7 seconds before capture.

- Only 1 snapshot can be taken each minute
- If an alarm occurs during 1-minute period, the alarm snapshot will save. An alarm snapshot captures 14 seconds, 7 before and 7 after event.

**Note:** turns gray for approximately **60 seconds** after snapshot taken.
Cont. ECG: Save/Review Waveform Snapshots

To capture waveform snapshot manually:
1. Touch 📷 to capture
2. Touch Review
3. Touch 🎨 to review waveform snapshot

- Waveform snapshots capture a **7-second strip**, to include the 7 seconds before capture.
- Only 1 snapshot can be taken each minute
- Alarming rhythm **automatically** saves and prints a strip (if set up to print upon alarm and device has a printer)
  - In Review tab, waveform icon appears red 🎨

**Note:** 📷 turns gray for **60 seconds** after snapshot taken. One snapshot per minute allowed
Waveform snapshots capture a 7-second strip, to include the 7 seconds before capture. Alarming rhythm automatically saves and prints a strip (if set up to print upon alarm and device has a printer). In Review tab, waveform icon appears red. 

Note: turns gray for 60 seconds after snapshot taken. One snapshot per minute allowed.

If devices connected, only HR and RR are sent to EMR; waveforms cannot be sent.
Patient Rest Mode

If devices are connected to a **Connex® Central Station (CS)** you may turn on patient rest mode.

**To use:**
1. Touch alarms tab
2. Choose **“Patient rest mode on”**

This feature allows disabling of audible alarms **at the bedside**, but keeps alarms on at CS.

**Note:** If connectivity from CS is lost, alarms will revert to previous audio state.
Switching Clinicians

1. **Touch Clinician Symbol**

   - When using **Intervals or Continuous profile**, follow these steps to switch the clinician identified as taking vitals.
   - **Note**: Both the clinician beginning his/her shift and clinician giving report should be at bedside for this process. Clinician should **send or delete all interval vitals** from Review tab **BEFORE** logging out.

   ![Image of Clinician Touch Symbol](image)

   - **Tiffany Moon:**
   - **Blood Pressure:** 103/71
   - **Pulse Rate:** 72
   - **SpO2:** 98%
   - **Temperature:** 98.3°F

Connectivity Required
Switching Clinicians

• When using **Intervals or Continuous profile**, follow these steps to **switch the clinician** identified as taking vitals.

• **Note**: Both the clinician beginning his/her shift and clinician giving report should be at bedside for this process. Clinician should **Send or Delete all interval vitals** from Review tab **BEFORE** logging out.

1. **Touch Clinician Symbol**
2. **Press Clear**
Switching Clinicians

- When using **Intervals** or **Continuous profile**, follow these steps to **switch the clinician** identified as taking vitals.

- **Note**: Both the clinician beginning his/her shift and clinician giving report should be at bedside for this process. Clinician should **Send or Delete all interval vitals** from Review tab **BEFORE** logging out.

1. **Touch Clinician Symbol**
2. **Press Clear**
3. Oncoming (new) clinician **scan/manually enter clinician ID** and **enter password** (if applicable)
4. **Press OK** to return to Home screen

- **New ID will display in ID field**
- **If enabled, Clinician Name will be pulled from EMR after pressing OK**
Switching Clinicians

- When using **Intervals or Continuous profile**, follow these steps to **switch the clinician** identified as taking vitals.

- **Note**: Both the clinician beginning his/her shift and clinician giving report should be at bedside for this process. Clinician should **Send or Delete all interval vitals** from Review tab **BEFORE** logging out.

1. **Touch Clinician Symbol**
2. **Press Clear**
3. Oncoming (new) clinician **scan/manually enter clinician ID** and **enter password** (if applicable)
4. **Press OK** to return to Home screen
5. **Visually confirm** correct clinician displayed
Follow these instructions to clear the Clinician ID if:

- Clinician is scanned, but then decides not to take vitals
- When Intervals monitoring has been stopped and clinician needs to clear ID (sign out)

Note: Powering down the CVSM will also clear the Patient ID, Clinician ID, and all vitals on the screen.

1. Touch Clinician symbol/ID
Clear Clinician ID

Follow these instructions to clear the Clinician ID if:

- Clinician is scanned, but then decides not to take vitals
- When Intervals monitoring has been stopped and clinician needs to clear ID (log out)

Note: Powering down the CVSM will also clear the Patient ID, Clinician ID, and all vitals on the screen.

1. Touch Clinician Symbol
2. Touch Clear
Clear Clinician ID

Follow these instructions to clear the Clinician ID if:
• Clinician is scanned, but then decides not to take vitals
• When Intervals monitoring has been stopped and clinician needs to clear ID (log out)

Note: Powering down the CVSM will also clear the Patient ID, Clinician ID, and all vitals on the screen.

1. Touch Clinician Symbol
2. Touch Clear to clear clinician info
3. Touch OK to return to Home screen
Clear Clinician ID

Follow these instructions to clear the Clinician ID if:
• Clinician is scanned, but then decides not to take vitals
• When Intervals monitoring has been stopped and clinician needs to clear ID (log out)

**Note:** Powering down the CVSM will also clear the Patient ID, Clinician ID, and all vitals on the screen.

1. Touch Clinician Symbol
2. Touch Clear to clear clinician info
3. Touch OK to return to Home screen
4. **Visually confirm** Clinician ID cleared from screen
Error Messages: Clinician ID Match

- Occurs when CVSM is unable to match scanned clinician ID with database
- **Verify Connectivity Symbol** is present before scanning clinician
- **Touch Clinician Symbol** before scanning and ensure correct Clinician ID barcode is being scanned
- See **ID Clinician** slide to review steps to properly ID clinician and retry

Press OK to clear message or Clear to start fresh
Error Messages: Clinician ID Required

- **Verify Connectivity Symbol** is present
- **Ensure Clinician Symbol was pressed** prior to scanning Clinician ID
- **Verify Clinician ID** appears in appropriate field on the Home screen
- **See ID Clinician** slide to review steps to properly ID clinician and retry

Press OK to clear message.
Error Messages: Patient ID Match

• Occurs when CVSM is unable to match scanned patient ID with patient information in EMR (electronic medical record)

• Ensure connectivity symbol is present before scanning patient

• Ensure correct Patient ID barcode is scanned from Home screen

• See ID patient slide to review steps to properly ID patient and retry

Press OK to clear message or Clear to start fresh
Error Messages: Patient ID Required

- **Ensure Patient ID** barcode scanned from Home screen.
- **Verify Patient ID** appears in the appropriate field on the Home screen.
- **See ID patient** slide to review steps to properly ID patient and retry.
Power Down/Sleep

Press Power button

Power Down: Touch to shut down

Sleep: Touch to turn off screen

Cancel: Touch to return to Home
See DFU for cleaning instructions for each accessory

For CVSM and Accessory Cable Management Stand:

- Clean on a routine basis according to your facility’s protocols and standards
- The following agents are compatible with the monitor:
  - Hydrogen Peroxide Cleaner Disinfectant Wipes (Clorox® Healthcare)
  - Dispatch Hospital Cleaner Disinfectant Towels with Bleach (Clorox® Healthcare)
  - 70% isopropyl alcohol
    - Wipe the monitor with a clean cloth slightly dampened with 70% isopropyl alcohol
  - 10% chlorine bleach solution
    - Wipe the monitor with a clean cloth slightly dampened with a 10% bleach and water solution
    - Rinse with a clean cloth slightly dampened with water
    - Allow the monitor surface to dry for a minimum of 10 minutes before using

Do not submerge or spray anything directly onto device
Support Resources

Customer Care:
1-800-535-6663

Website:
www.welchallyn.com

All Resources:

Blood Pressure Accuracy and Variability – Quick Reference: