

# EMS MONITORS – A REGIONAL APPROACH



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# PROBLEM STATEMENT

- Cardiac monitors are an essential and required piece of equipment in the provision of advanced life support care.
- All agencies in Washington County (with exception of one) carry the same monitor system (Philips MRX). Those monitors are at both end of life and end of support. They are in need of replacement.
- Clackamas County agencies are also beginning the process of replacement – although on a less stringent timeline. (Canby and Molalla excepted)

# A REGIONAL APPROACH

- There are benefits to a regional approach and working toward a common monitor platform:
  - Patient safety – Our agencies run multiple calls together and a uniform platform reduces likelihood of error due to machine unfamiliarity.
  - Interchangeability during a crisis
  - Enhanced ability to share data for improved patient outcomes and quality improvement
  - Regional approach to service/maintenance
  - Group pricing




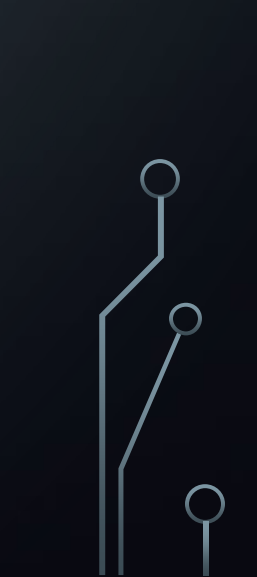
# THE PROCESS

A multi-county, multi-agency workgroup was convened with representation from:

- AMR Clackamas
- Banks Fire
- Canby Fire
- Clackamas County EMS
- Clackamas Fire
- Colton Fire
- Estacada Fire
- Forest Grove Fire
- Hoodland Fire
- Lake Oswego Fire
- Molalla Fire
- Metro West Ambulance
- Sandy Fire
- Tualatin Valley Fire & Rescue
- Washington County EMS



# THE PROCESS

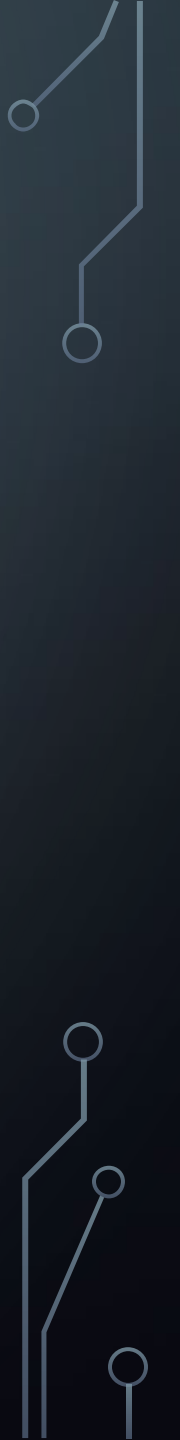
- Initial survey of stakeholder
  - “Road shows” by monitor companies
  - Hands on time with crews
  - Meetings with small Washington-County workgroup
  - Challenges
    - Availability of monitors
    - COVID reduced hands on time
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# CONSIDERATIONS

- Crew usability
- Clinical features
- Data management
  - Data transmission to EMS agency and hospital
  - Availability of data for quality improvement
- Service/warranty
- Cost – considering both initial and long-term



# THE CONTENDERS



# PHILIPS TEMPUS ALS

- Tempus Pro developed by DOD in 2011 but without defib/pacing capability
- Philips bought monitor company and developed separate defib/pacing
- Built-in real-time CPR feedback
- Defib/pacing is a separate unit that is paired with main monitor
- Most advanced attachments
  - Ultrasound probe
  - Video laryngoscope





# ZOLL X-SERIES ADVANCED

- X-Series developed in 2012
- X-Series Advanced is a “refresh” available end of 2020
- Built-in real-time CPR feedback
- New clinical features
  - Real time ventilation feedback
  - TBI “dashboard”



# STRYKER LIFEPAK 15 V. 4

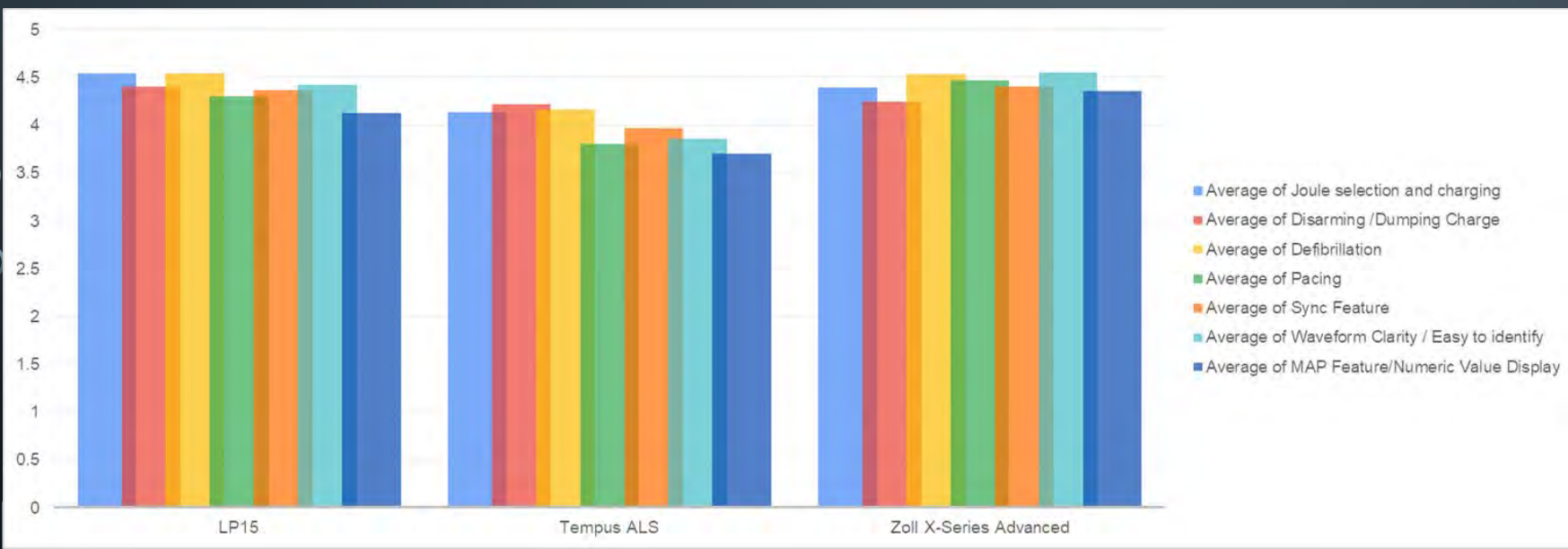
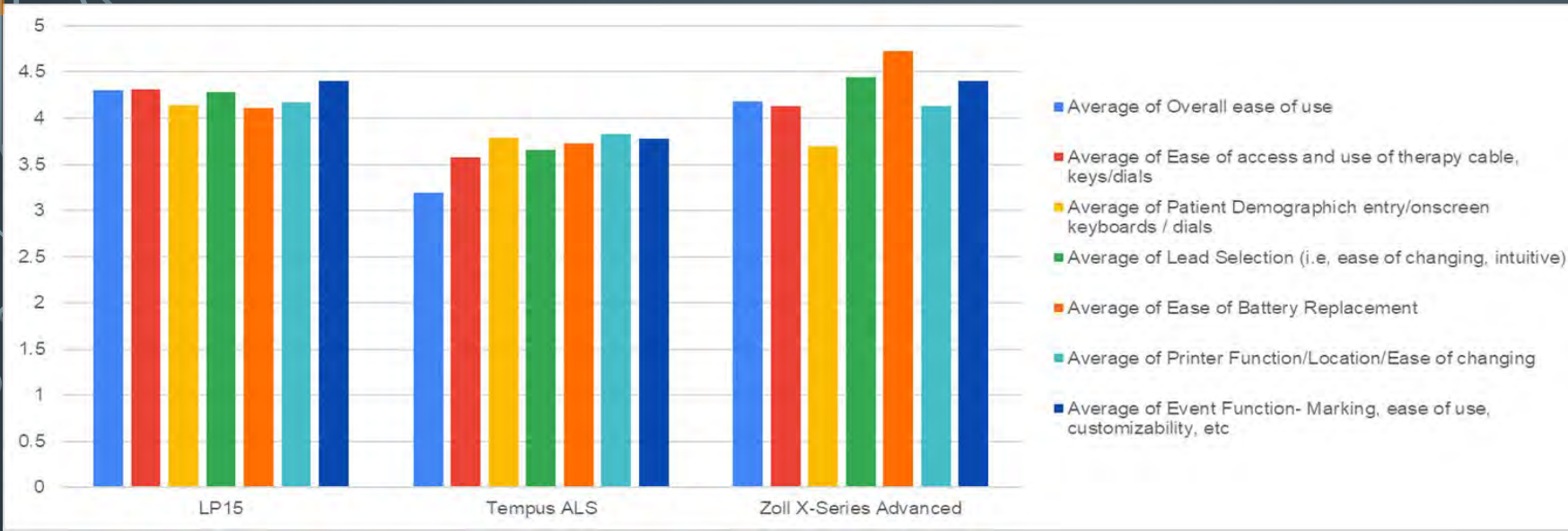
- Original LP15 was developed in 2009
- V4 is a 2016 refresh of the LP15 with enhanced communication/data tools
- Does NOT have real-time CPR feedback but has built-in CPR metronome
- EMS community is expecting next generation of this monitor as early as 2023



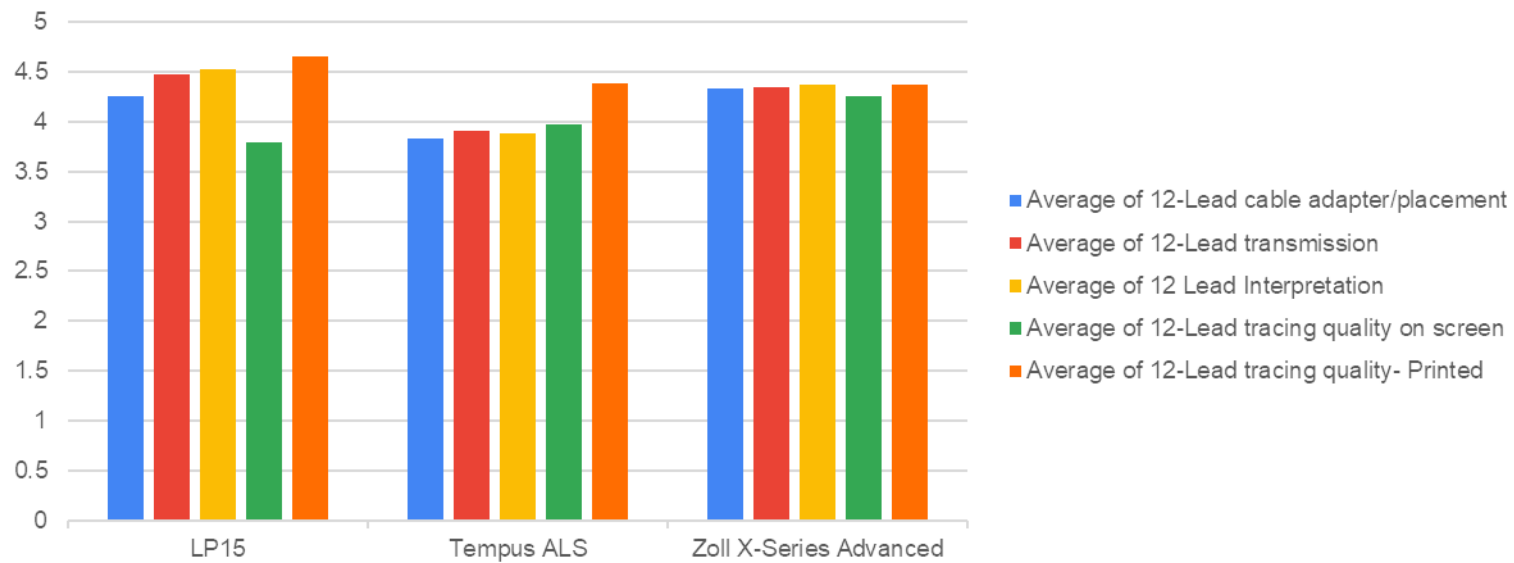


End User Evaluations

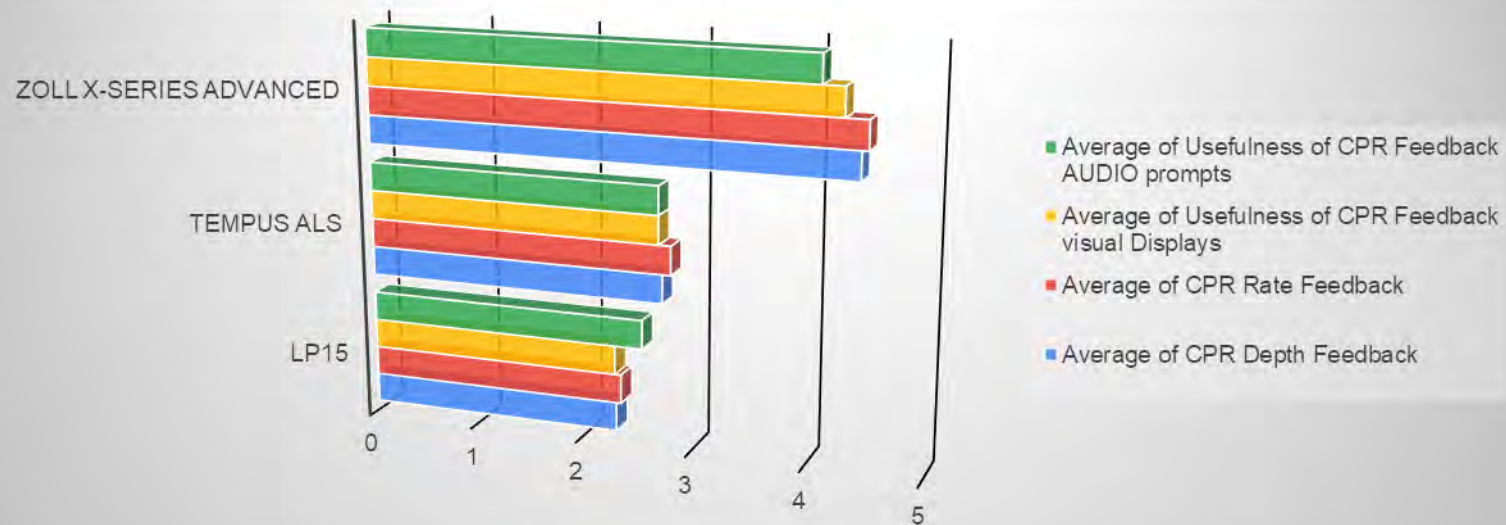
Clinical Features



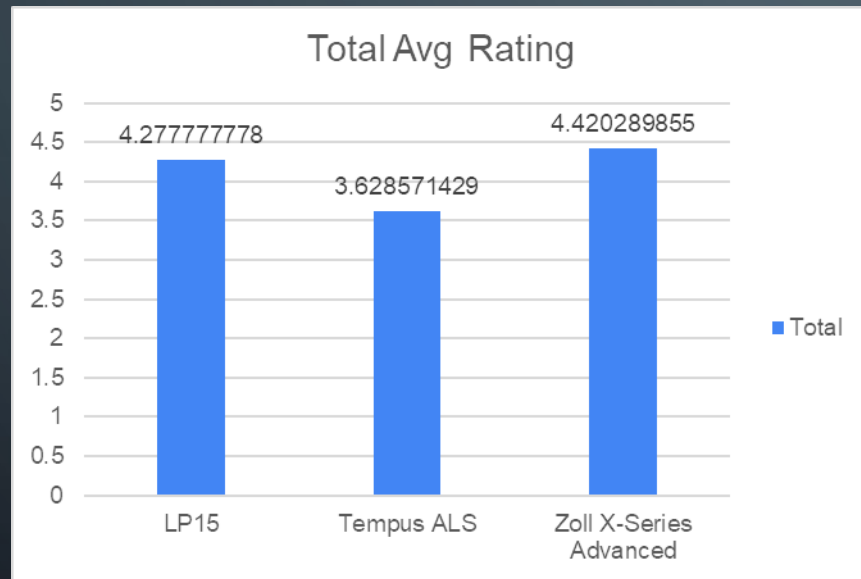
# CLINICAL EVALUATION BY CREWS



# 12 LEAD AND CPR FEEDBACK



# OVERALL CLINICAL EVALUATION



- Overall rating – LP15 and Zoll X outperformed Tempus ALS
  - Most did not like having two separate pieces
  - Some things were done through monitor and others through defib box.
  - Display on Tempus too small
  - Post “roadshow” discussions with EMS leadership with similar feedback
- Clinical feedback strongly against Philips Tempus (despite cool bells and whistles)

# CARDIAC ARREST MANAGEMENT

- Mechanical CPR integration - key component of an ECMO-CPR program
  - Stryker – LUCAS Device
  - Zoll – Autopulse
  - Philips - ?
- Better rhythm analysis
  - Stryker – cprINSIGHT already on AEDs and will be on next version of monitor
  - Zoll – See-Thru CPR
  - Philips -?
- STEMI management
  - Philips and Stryker use same EKG algorithm
  - Zoll - different algorithm



The image features a dark blue background with white, stylized circuit board traces in the corners. These traces consist of straight lines, right-angle turns, and small circles, resembling a printed circuit board layout. The traces are located in the top-left, top-right, bottom-left, and bottom-right corners, framing the central text.

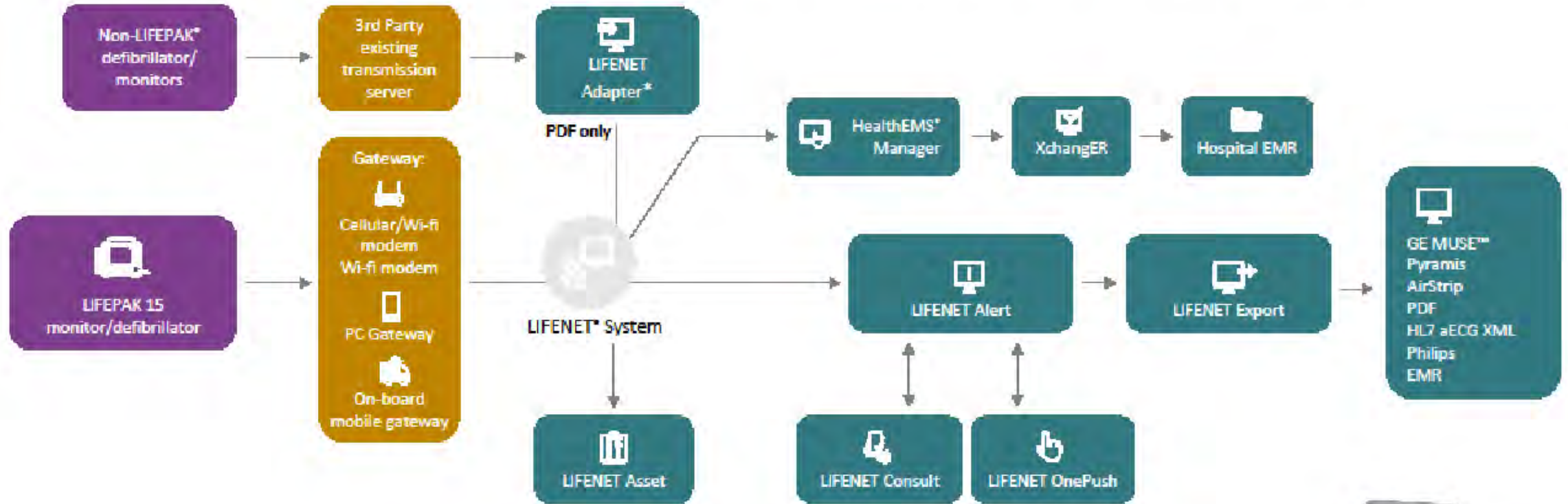
# DATA TRANSMISSION AND MANAGEMENT



# DATA CONSIDERATIONS

- Integration of data into ePCR
- Transmission of data to hospital
  - 12 lead EKG, etc
  - Potential integration into other alerting products (Pulsara, ESO alerting, LifeNet, etc)
- Post call analysis/trends
  - Cardiac arrest review
  - Access to raw monitor data for other clinical review
    - Airway
    - Trauma
    - Shock
    - Other
- Reality – All of these companies now see themselves as “data companies” as much as hardware

# Monitor/defibrillator EMS into hospital



Devices

Connectivity

Software Applications

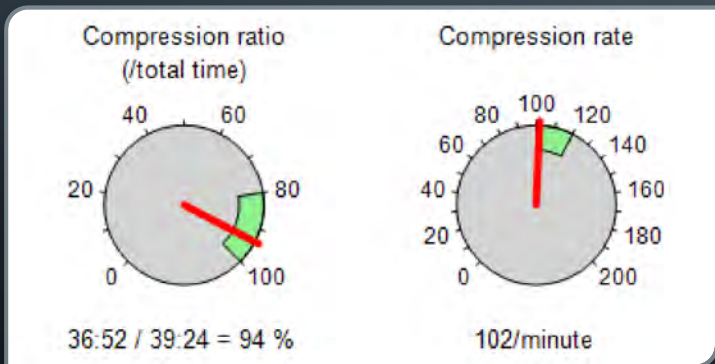
\*Please consult on full data flow



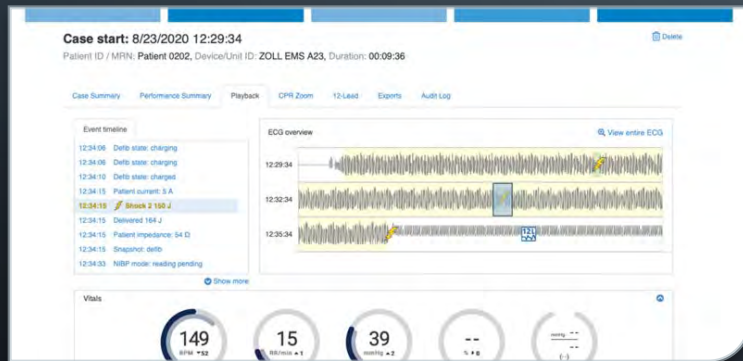
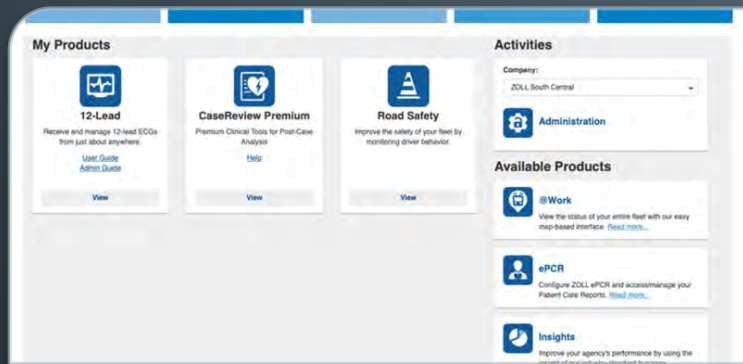
# STRYKER DATA PLATFORM - CODE-STAT



- Can push monitor data (vitals, etc) to a NEMESIS compliant ePCR
- Code-STAT = Stryker cardiac arrest review software
  - Allows for post-event CPR review.
  - Already widely used in region
  - Cost for each software license but no other costs after that.
- OTHER MONITOR DATA IS EASILY DOWNLOADABLE (PCO file) - “It’s your data”



# ZOLL



- Can push monitor data (vitals, etc) to a NEMESIS compliant ePCR
- Integrates into Pulsara plus has their own cloud-based solution
- All data is managed through their cloud based solution
- Subscription based model.
  - Monitor data is accessible and held in the cloud for six years (as long as subscription is paid).
  - Data not easily downloadable for independent analysis or research
  - Building other clinical analytic tools

# There are “hidden” costs associated with getting the data

- Medical directions is very interested in reviewing monitor data on a wide variety of calls (airway, trauma, pediatrics, etc) and not just CPR.
- Costs associated with getting the data into the PCR
- Costs associated with getting complete monitor data out of the “box.”
- Overview of IT discussions

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# SERVICE/WARRANTY

# Service & Warranty Requirements

- **Warranty Length** - 10-year full coverage with locked price for 10 years
- **Extent and level of coverage**
  - Battery replacement included (10-year agreement)
  - Full replacement coverage day 1 - last day of the 10- year contract.
  - Annual replacement/refresh of components for each monitor when needed
- **Annual PM** - Annual PM Coordinated and conducted by vendor technicians, limit unit OOS time
- **Service-regional/local** - Local reps available, quick response at all hours
- **Technical capabilities of field technicians** - Field Technicians stock parts and components locally and are certified and capable to perform in-depth repairs on-site with minimal need to send monitors out via mail for off-site repairs.
- **Loaner devices** - Loaner devices readily available in the Portland metro area.
- **Value added Services** - Availability of customizable packages with service and maintenance packages available for additional products

# Zoll Service & Warranty

- **Warranty Length-** 10-year full coverage with locked price for 6 years, price estimated for years 7-10
- **Extent and level of coverage-**
  - Battery replacement included (10-year agreement)
  - Full replacement coverage day1-last day of the 10- year contract.
  - Annual replacement per monitor when needed:
    - Case, straps, other misc. components
- **Annual PM-** Annual PM Coordinated and conducted by Zoll Service Technician
- **Service-regional/local-** Local rep(1).
- **Technical capabilities of field technicians-** Field Techs carry minimal components and parts needed to make in-field repairs. Any repairs requiring the opening of the monitor will be sent out via mail for repairs at Zoll facilities.
- **Loaner devices-**Loaner devices readily available in the Portland metro area. 5- Will be housed at TVFR
- **Value added services-** Not Applicable



# Stryker Service & Warranty

- **Warranty Length** - 10-year full coverage with locked price (ALS Package)
- **Extent and level of coverage-**
  - Battery replacement included (10-year agreement)
  - Full replacement coverage day1-last day of the 10- year contract.
  - Annual replacement per monitor when needed:
    - Screen, handle, case, straps, exterior components, strap, other misc. components
- **Annual PM** - Annual PM Coordinated and conducted by Stryker Service Technician Team; Pity Crew Approach to lesson down-time (ALS 360)
- **Service-regional/local** - Local reps. Guaranteed 24 or less turnaround for on-site techs.
- **Technical capabilities of field technicians** - Field Techs carry all components and parts needed to make in-field repairs for 99% of possible issues with monitors.
- **Loaner devices** - Loaner devices readily available in the Portland metro area.
- **Value added services** - ALS 360 Package allows for the addition of other Stryker devices: Stryker cots, and Lucas devices, AEDs purchased can be covered for full Pro-Care Top tier service, warranty, and annual PM.
- \*\*\*NOTE ALS 360 Quote included 7 new Powerloads with a “Tech Refresh” within the 10 years.

# Stryker Pro-Care Overview

## ProCare plan entitlements

### LIFEPAK 15

#### Preventive maintenance

- Update software to the most current version
- Check all batteries and battery pins
- Inspect the integrity of accessories and recommend replacement as needed
- Test the integrity of all cables and recommend replacement as needed
- Electrical safety check in accordance with NFPA guidelines
- Computer-aided diagnostics to test 30 device dimensions and verify the unit functions accurately, from waveform shape and defibrillation energy to pacing current and capnography readings (if present)
- Check electrode expiration dates and recommend replacement as needed
- Check printer operation and trace quality

#### Protect plan

- Repairs (parts and labor) to restore equipment to manufacturer specifications
- LIFEPAK battery-charger repair or replacement as deemed necessary by Stryker\*
- Power-adaptor repair or replacement
- Replace up to 3 lithium-ion batteries in accordance with the device operating instructions or upon failure\*
- Replace up to 1 coin cell memory battery in accordance with the device operating instructions or upon failure\*

#### Prevent plan

- Combines benefits of Protect and Preventive Maintenance Service Plans
- Replacement of protective display shield, corner bumper guards, CO2 connector cover, shoulder strap, handle, device labels, and battery pins as deemed necessary by Stryker at time of annual inspection.



**LIFEPAK 15**  
monitor/defibrillator



COST



# ZOLL

- Discounted base price - \$33,111.83
- CaseReview Premium, 5 years- \$1,995 per monitor
- RemoteView (Real-time hospital view), 5 years - \$3,995 per monitor
- Trade-in value
  - Philips MRX - \$2,500 each
  - LP15 - \$7,500
  - Zoll X - \$7,500
- Service/Warranty, 5 Years - \$6,329

# STRYKER

- LP15, V4 - \$27,134.80
- LifeNet – no fee
- CodeStat - \$1800 per computer license. Typically, 1 per agency.
- Warranty/Service - \$1350/year (\$6,750 over 5 years)
- Trade-in
  - Philips MRX - \$4,000
  - Zoll X - \$6,500
  - LP15 (not v4) - \$7,500
- Includes depreciation guarantee
  - Expecting new ALS monitor in 2023. Several local personnel have been involved in market research around the development of this monitor.



### ALS Trade-up Schedule

<u>Months</u>	<u>% of Orig Purchase</u>
0-9	90%
9-12	85%
12-15	81%
15-18	77%
18-21	74%
21-24	70%
24-27	66%
27-30	62%
30-33	58%
33-36	55%
36-39	51%
39-42	47%
42-45	43%
45-48	40%

Thank you for your partnership and commitment to Stryker, as together with our customers we are driven to make healthcare better.

# STRYKER ALS360 PROGRAM

- Stryker allows “bundling” of various resources/purchases into ALS360.
- Can be per agency or as a collective.
- ALS360 price for monitor is \$6,812 per year for 10 years (can pay on any schedule)
  - Locked in service price
  - Locked in price for new ALS monitor
  - 10 year 0% financing
  - Full coverage service including batteries
  - Ability to add on LUCAS, Power Pro, Power Load, Stair Chairs and data products and get refresh on ALL Products
  - Any changes to data plan would be included
- LUCAS device is \$4170/year for 10 years.
  - Again includes replacement

# RECOMMENDATION – STRYKER LIFEPAK

- Transition to LP15, V4 now with plan to upgrade to new Stryker ALS monitor in 2023/2024
- Stryker and Zoll outperformed Tempus with crews (even though Tempus “newer”)
  - Current Stryker without direct CPR feedback (biggest drawback)
    - Does include metronome.
    - Clackamas and Multnomah primarily on LP and have comparable (or better) cardiac arrest resuscitation rates
    - There are “standalone” CPR feedback devices in interim
  - LUCAS device is preferred mechanical CPR device. Broader implementation of LUCAS recommended by medical direction
- Zoll data with more limitations and greater costs. Inability to directly access data is a concern.
- Stryker willing to guarantee trade-in value up front with transition to new monitor. (Price of new ALS monitor is unknown)
- ALS360 program guarantees monitor cost for next 10 years. After 10 years, all hardware is owned.
  - Considering needs of community that includes LUCAS devices, ALS360 may make sense
  - Community-wide ALS 360 program?
    - Would give smaller agencies that only need monitors the ability to be involved in contract
- Implementation should occur as a County-wide rollout