

Het samenbrengen van data uit alle verschillende medical devices draagt bij aan snellere en betere inventies

25 Mei 2022

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ascom

Agenda

25 Mei 2022 – 15:40-16:10 uur

- Van data naar relevante informatie
- Geef de zorg context bij alarmen uit medical devices
- Situational awareness in kritische zorgomgevingen
- Ondersteuning bij klinische besluitvorming



Vision

Close the digital information gaps allowing for the best possible decisions anytime and anywhere.




Mission

Provide critical information to the right person, in the right place, at the right time to take the right decisions, Ascom is the leading company in Critical Communication and Collaboration.



Hospitals and acute care

Orchestrate mission-critical events and provide an optimal response and workflow



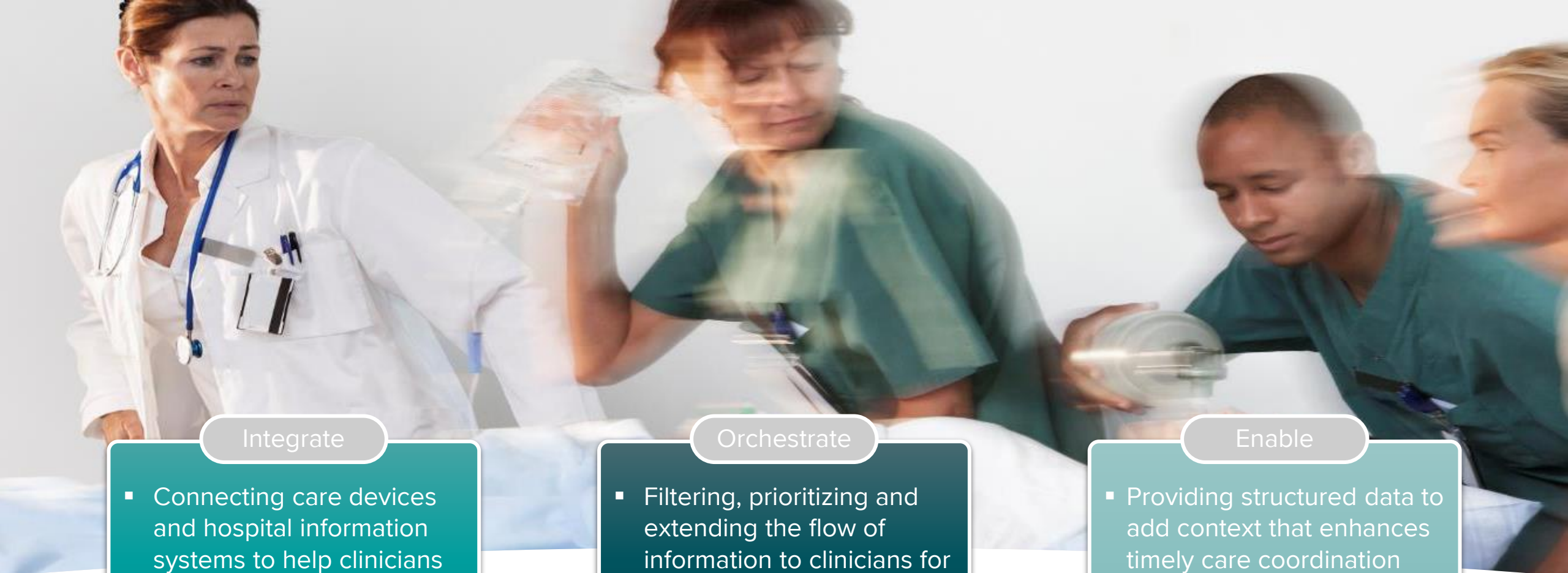
Long-term care

Increase situational awareness and allow for optimal priority setting



Enterprise

Offer mobile workflow orchestration solutions for mission-critical challenges



Integrate

- Connecting care devices and hospital information systems to help clinicians unlock valuable care information

Orchestrate

- Filtering, prioritizing and extending the flow of information to clinicians for responsive, informed decisions

Enable

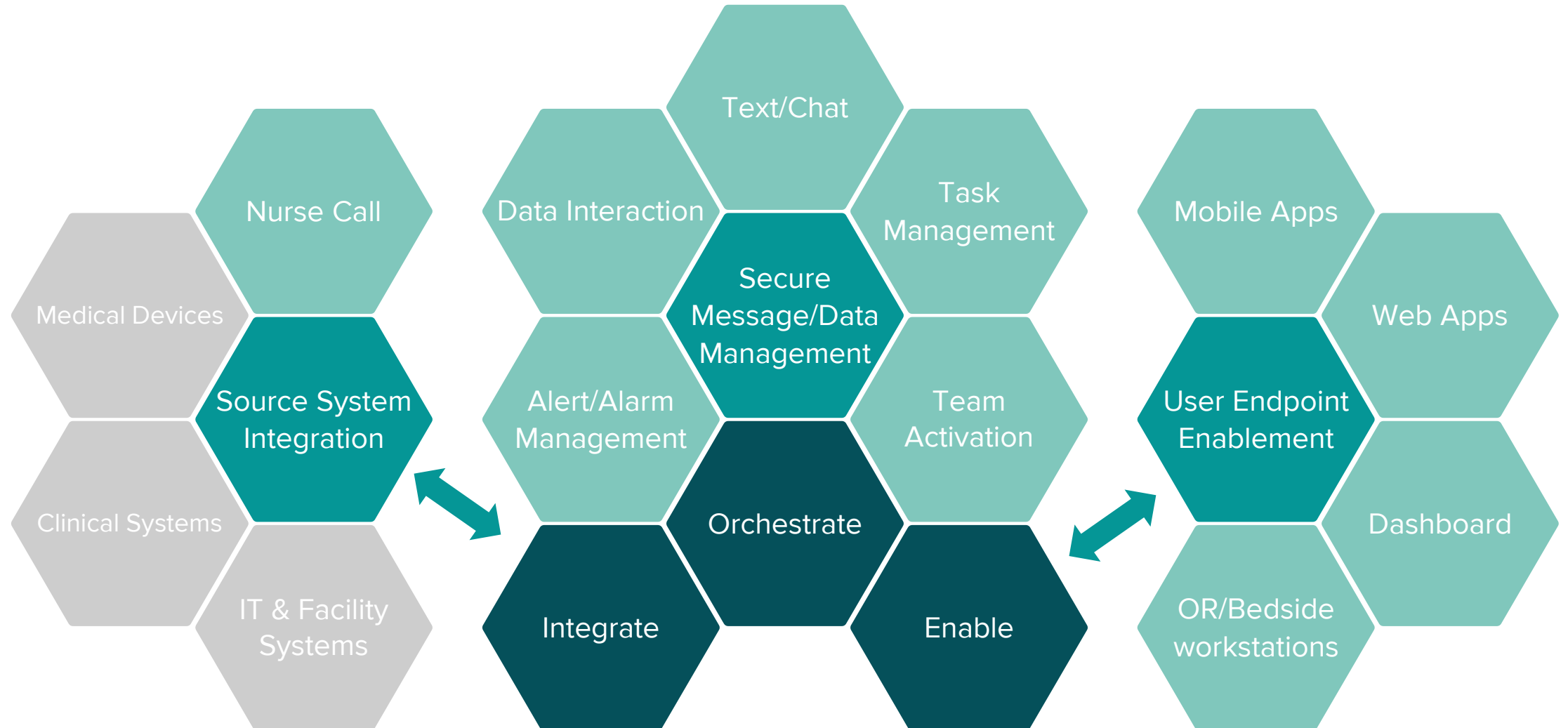
- Providing structured data to add context that enhances timely care coordination and communication across mobile teams, to address patient needs

Klinische samenwerking & communicatie

ascom

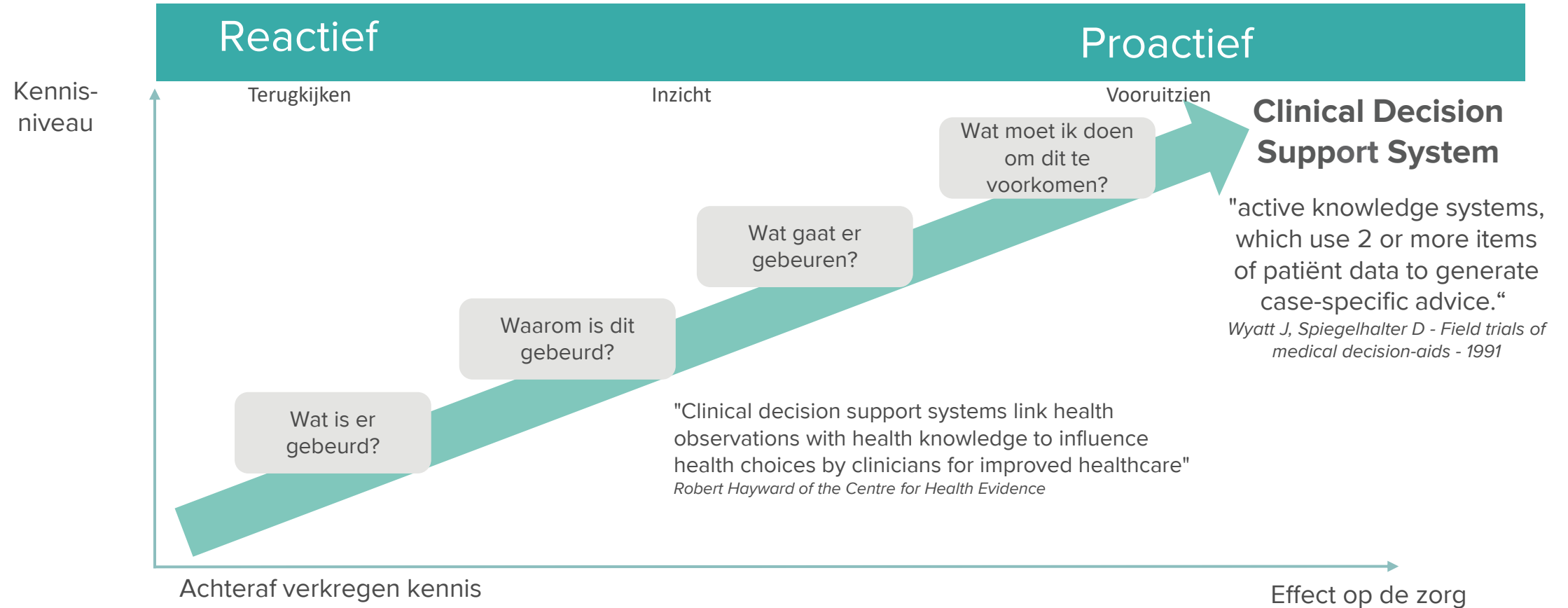
Het Ascom Healthcare Platform

Overzicht RealTime communicatie & samenwerking



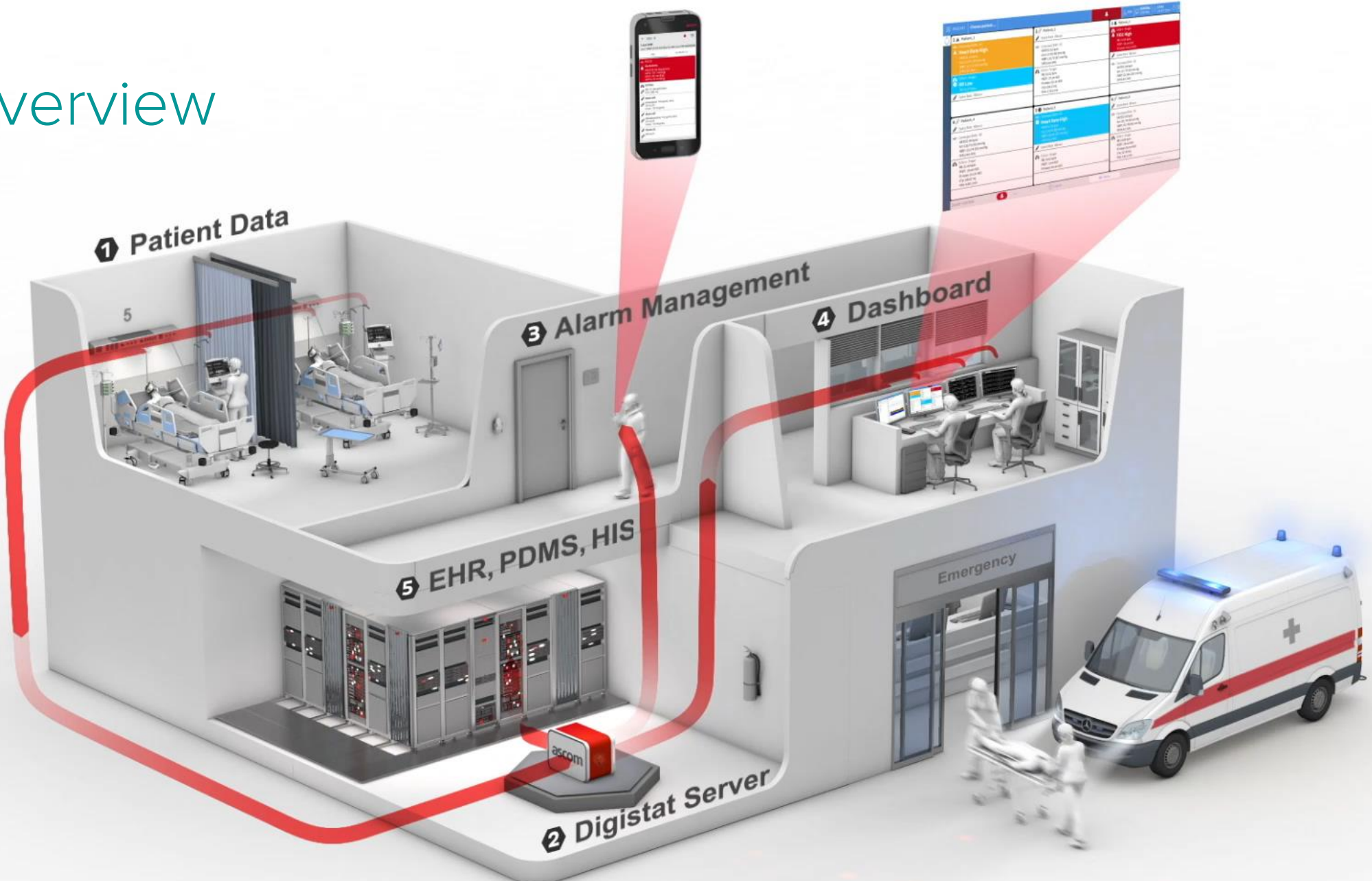
Van reactief naar proactief

Zorg ondersteunen met een vooruitziende aanpak



Bron: Gartner RTHS 2019

Overview



Uitdagingen

De complexiteit verschilt per afdeling

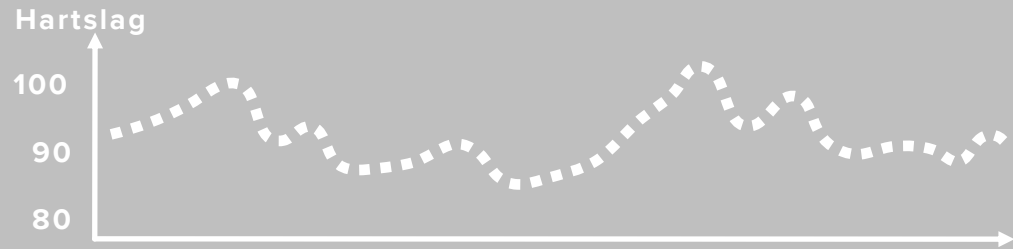


Te beheren gegevens





Informatie verkregen van medische apparatuur



worden “continu” gegenereerd:

- Vitale parameters van de patiënt (bijv. hartslag)
- Apparaatinstellingen (bijv. een patiëntmonitor de onderste drempelwaarde die een alarm voor de hartslag triggert)
- Technische parameters (bijv. aantal uren in bedrijf sinds laatste kalibratie)

Hartslag
Hoog

VTAC

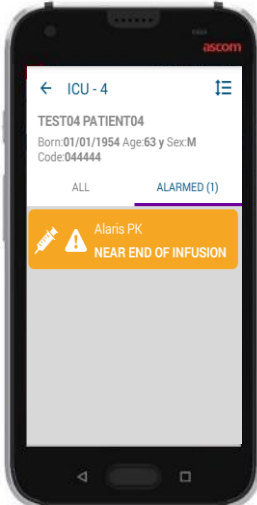
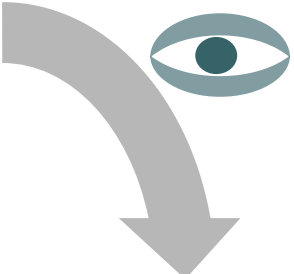
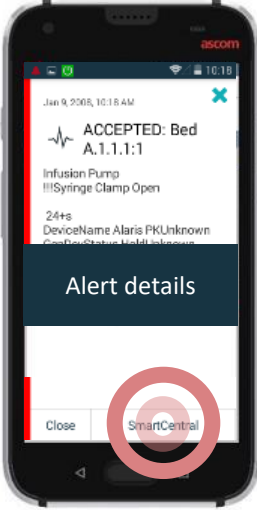
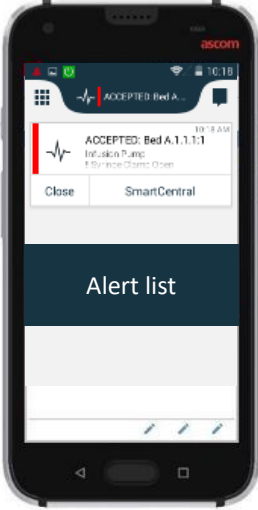
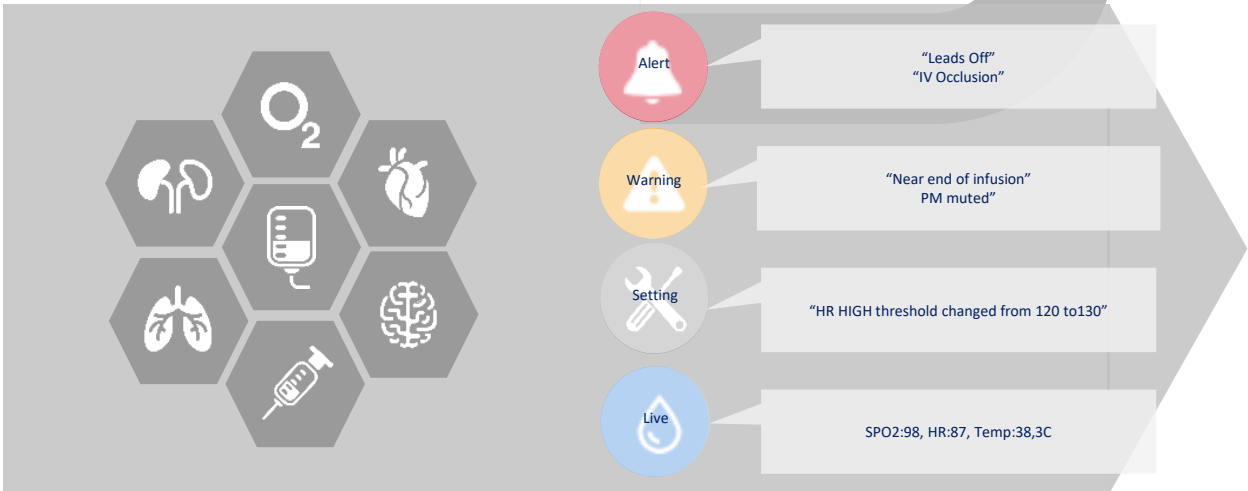
SPO2
Laag

Gebeurtenissen

komen “sporadisch” voor:

- Alarmen (bijv. het alarm dat door de patiëntmonitor wordt gegenereerd wanneer de hartslag een ingestelde drempelwaarde bereikt)
- Klinische gebeurtenissen (bijv. een bolus in een infuuspomp)
- Technische gebeurtenissen (bijv. wanneer de stroomtoevoer is onderbroken)

Alarm Management and Situational Awareness



Situational Awareness: Zichtbaarheid data

- Snel totaaloverzicht over patiënten en de medical device data
- Helpt verpleegkundigen om informatie en waarschuwingen effectief te beheren
- Biedt context voor het evalueren van alarmen
- Visuele en akoestische statusinformatie van medische apparaten zonder de quarantainezone te betreden in geval van infectie
- Bekijk in één oogopslag de situatie op de afdeling
- Alle gebeurtenissen en berichten opslaan in logboek
- Camera integratie – vraag beelden op bij events



1 **Patient, 1**

Carescape B450 - GE

Heart Rate High
 HR ECG: 63 bpm
 Art: 119/75 (90) mm Hg
 NIBP: 117/79 (92) mm Hg
 SPO2 Art: 86%

Evita 4 - Drager

RR Low
 RR: 19.57 bpm >>>

Space Rack - BBraun

2 **Patient, 2**

Space Rack - BBraun

Carescape B450 - GE
 HR ECG: 62 bpm
 Art: 117/85 (96) mm Hg
 NIBP: 115/73 (87) mm Hg
 SPO2 Art: 84%

Evita 4 - Drager
 RR: 20.31 bpm
 PEEP: 27 cm H2O
 PI mean: 52 cm H2O
 VT_e: 334.13 mL
 MV_e: 3.78 L/min

3 **Patient, 3**

Evita 4 - Drager

FiO2 High
 RR: 21.59 bpm
 PEEP: 28 cm H2O
 PI mean: 53 cm H2O >>>

Space Rack - BBraun

Carescape B450 - GE
 HR ECG: 68 bpm
 Art: 117/79 (92) mm Hg
 NIBP: 131/84 (100) mm Hg
 SPO2 Art: 92%

4 **Patient, 4**

Space Rack - BBraun

Carescape B450 - GE
 HR ECG: 69 bpm
 Art: 125/73 (90) mm Hg
 NIBP: 131/74 (93) mm Hg
 SPO2 Art: 92%

Evita 4 - Drager
 RR: 21.58 bpm
 PEEP: 29 cm H2O
 PI mean: 54 cm H2O
 VT_e: 340.87 mL
 MV_e: 4.06 L/min

5 **Patient, 5**

Carescape B450 - GE

Heart Rate High
 HR ECG: 70 bpm
 Art: 125/85 (98) mm Hg
 NIBP: 128/82 (97) mm Hg
 SPO2 Art: 94%

Space Rack - BBraun

Evita 4 - Drager
 RR: 19.91 bpm
 PEEP: 3 cm H2O
 PI mean: 54 cm H2O >>>

6 **Patient, 6**

Space Rack - BBraun

Carescape B450 - GE
 HR ECG: 65 bpm
 Art: 131/74 (93) mm Hg
 NIBP: 131/78 (96) mm Hg
 SPO2 Art: 92%

Evita 4 - Drager
 RR: 19.89 bpm
 PEEP: 28 cm H2O
 PI mean: 55 cm H2O
 VT_e: 327.40 mL
 MV_e: 3.86 L/min

Activate Windows
 Go to Settings to activate Windows.

1 Jones, Care Male 47 y MRN: 20000001

Space Rack - BBraun
 P1: 27 mcg/h, 0.54 mL/h, 50 mcg/mL, 00:06:52remaining
 P2: Dobutamine20 mmol/h, 2 mL/h, 10 mmol/mL, 00:10:02remaining

Carescape B450 - GE
 HR ECG: 65 bpm
 Art: 127/80 (96) mm Hg
 NIBP: 127/80 (96) mm Hg
 SPO2 Art: 90%

Evita 4 - Drager
 RR: 22.45 bpm
 PEEP: 44 cm H2O
 PI mean: 63 cm H2O
 VTe: 340.83 mL
 MVe: 4.01 L/min

Pump 1: Next EOI: 00h06m

Alarms and events **Vital signs** **Charts**

Range: 1 hour 6 hours 12 hours 1 day

Filter: Off On

Oxy-CRG

12:32
 HR: 65 bpm
 RR: 21.27 bpm
 SPO2: 90 %

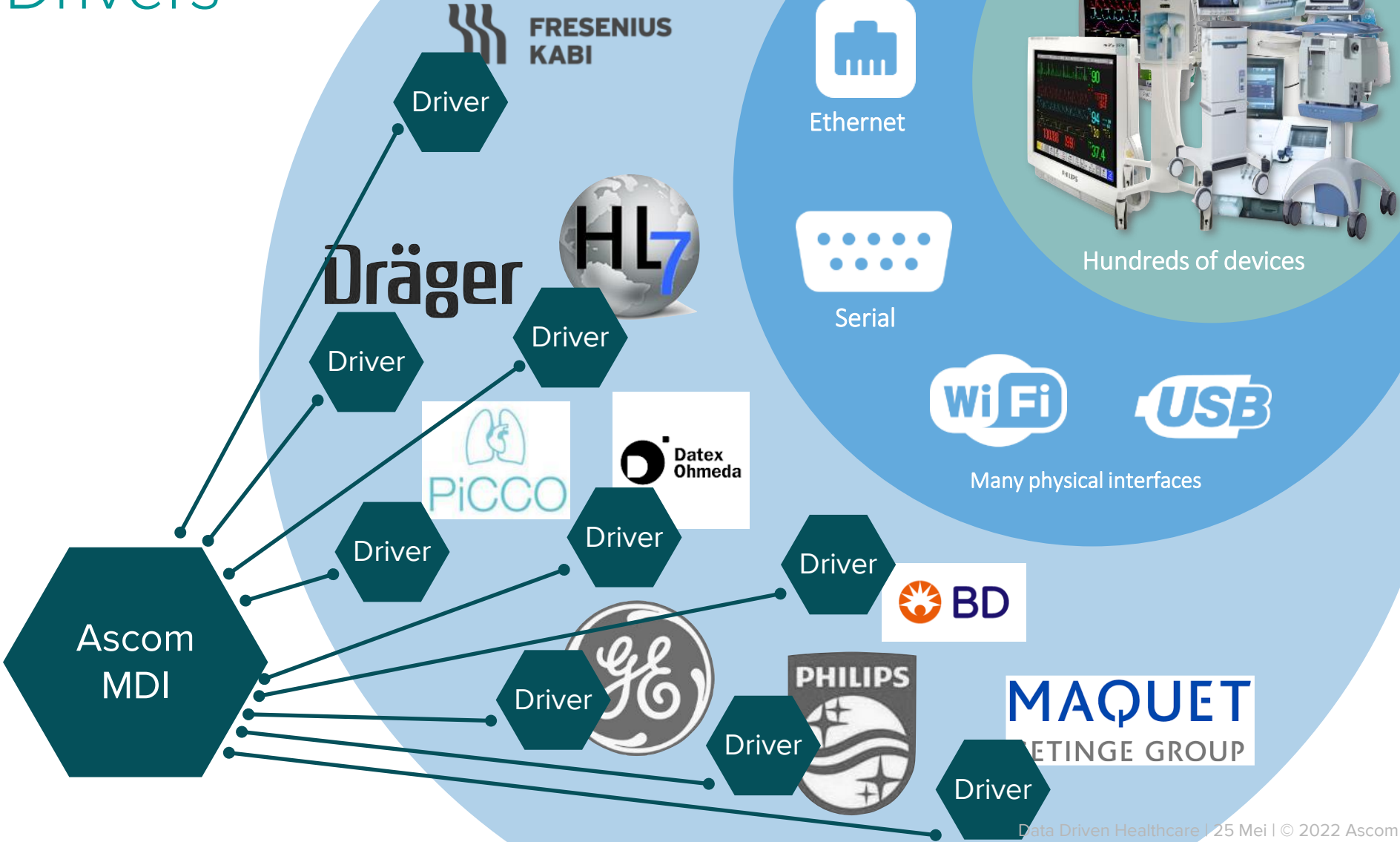
Arterial Pressure

12:31
 ARTs: 127 mm Hg
 ARTm: 96 mm Hg
 ARTd: 80 mm Hg

DEVICE EVENTS from 12:15 to NOW

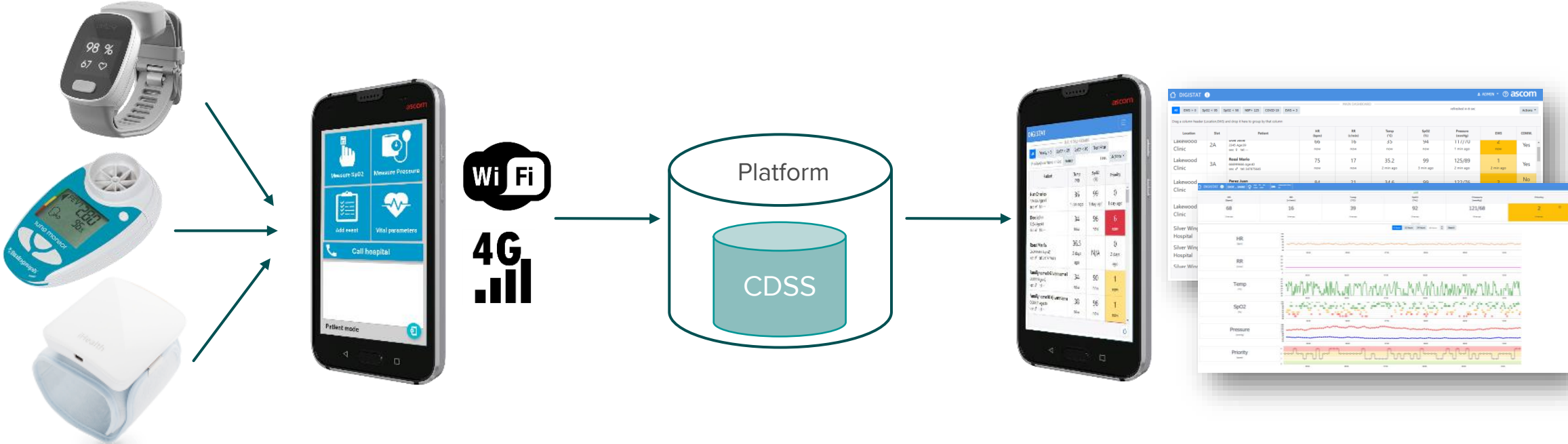
HIGH 🔔 🔔 12:33:08 FiO2 High 🔔
 MEDIUM ! ! !
 LOW ! ! !

400+ Drivers



Integrate, Orchestrate, Enable

Bluetooth gateway and monitoring dashboard



Integrate

- Simple association workflow
- Collect vitals in near real-time
- Wi-Fi or 4G (hospital or home)

Orchestrate

- Manage predictive analytics rules
- Generates notifications

Enable

- Monitor several patients
- Current and historical data
- Patient status notifications

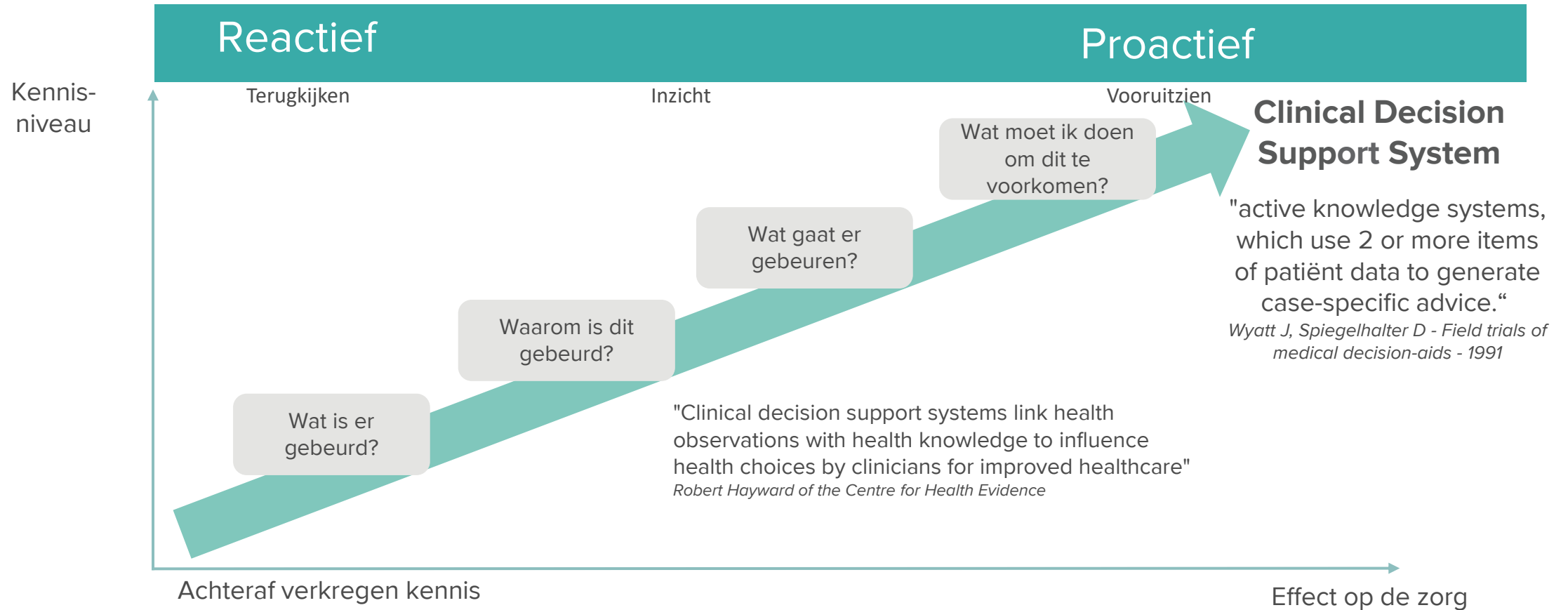
Clinical Decision Support System (CDSS)

"Actieve kennissystemen, die twee of meer patiëntgegevens gebruiken om casusspecifiek advies te genereren."

Wyatt J., Spiegelhalter D. - Field trials of medical decision-aids, 1991

Trend: van reactief naar proactief

Zorg ondersteunen met een vooruitziende aanpak



Bron: Gartner RTHS 2019

Ondersteuning bij klinische besluitvorming

Wat is er allemaal beschikbaar?

Input

Opgeslagen/near-realtime gegevens

PDMS/EPD

Therapie

Logboek

Scores

Formulieren
(configureerbare gestructureerde data)

MDI

Vitale parameters in near-realtime

Alarmen en gebeurtenissen

Handmatig verzamelde parameters

Overige bronnen

ADT

Laboratorium

Overige

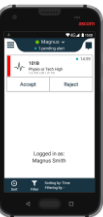
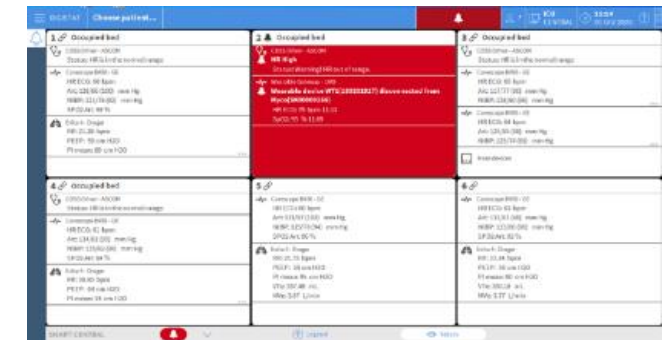
Videobewaking

Rule Based Engine



Output

Nieuwe gegevens + meldingen



Location	Site	Patient	HR	SpO2	Temp	SaO2	Pressure	Priority	CRS
Lakewood Clinic	1A	Don John	69	16	38	100	123/86	1	Yes
Lakewood Clinic	2A	Don Jane	64	16	41	100	121/67	1	Yes
Lakewood Clinic	3A	Road Mark	73	13	34	96	N/A	N/A	No
Lakewood Clinic	8A	Mark Paul	91	19	N/A	97	N/A	2	No
Silver Wing Hospital	B1	Reddyman1 Ghansham1	68	16	38	92	126/75	2	Yes
Silver Wing Hospital	B10	Reddyman10 Ghansham10	62	16	35	104	115/70	1	Yes
Silver Wing Hospital	B11	Reddyman11 Ghansham11	61	16	38	90	109/66	3	Yes
Silver Wing Hospital	B12	Reddyman12 Ghansham12	67	16	38	92	109/67	2	Yes



Derden (HL7)

CDSS

Hoe maken we rules inzetbaar?

- Een eenvoudige gebruikersinterface
- Lijst van beschikbare regels per afdeling
- Rules per patiënt of voor alle patiënten in-/uitschakelen
- Instellingen per patiënt of alle patiënten wijzigen
- CDSS-meldingen kunnen naar mobiel device of Smart Central worden gestuurd
- Berekende parameters en meldingen van CDSS worden in Smart Central weergegeven als een apparaatmelding

The screenshot shows the Smart Central interface for a patient in an ICU. The patient is identified as 'Occupied bed'. The interface displays various medical parameters and drug administration records. On the right, a configuration window is open, allowing the user to select and configure rules for the current patient. The rules listed are 'Single Parameter', 'Multi Parameter', 'EWS', and 'qSOFA'. The 'EWS' rule is currently selected. Below the rule list, there are buttons for 'ENABLE', 'DISABLE', 'ENABLE ALL PATIENTS', and 'DISABLE ALL PATIENTS'. A section titled 'Configurable parameters for Single Parameter rule:' shows three rows of parameters with their current values and target ranges. The first row is 'HR (bpm)' with a current value of 40 and target ranges of 50 to 150. The second row is 'RR (r/min)' with a current value of 8 and target ranges of 10 to 50. The third row is 'RR: bpm' with a current value of 1 and target ranges of 1 to 1. At the bottom of the configuration window, there are buttons for 'SAVE SETTINGS CURRENT PATIENT' and 'SAVE AND ASSIGN TO ALL PATIENTS'.

1 Mario, Rossi MR

EWS: **1** - Time: 10:51
EWS Params: Temp:35,5C;SpO2:98,00%;P:160,00 mmHg;

HR ECG: **83.0** bpm
SpO2: **98** %
RR: **19.0** bpm
Temp Other: **35.5** °C
NBPs: **160** mm Hg
NBPd: **94** mm Hg

CDSS rules samenstellen

The screenshot displays the SMART CENTRAL interface for patient Doe, John (MRN: FRATELLOMETALLO2). The top navigation bar includes 'DIGISTAT', patient information, and system status. The left sidebar shows patient vitals and equipment. The main content area is divided into two panels:

- Left Panel:** Patient vitals and equipment status.
 - CDSS CDSS qSOFA: qSOFA INDEX: 1 Time: 12:36
 - GEMonitor Carescape B450 IX34113342: HR ECG: 64 bpm, Art: 115/74 (88) mm Hg, NIBP: 125/75 (92) mm Hg, SPO2 Art: 92%
 - EvitaVentilator Evita 4 IX12M5013: RR: 21.95 bpm, PEEP: 25 cm H2O, PI mean: 25 cm H2O, VT_e: 324.67 mL, MV_e: 3.85 L/min
- Right Panel:** Rule configuration interface.
 - Header: "Select a rule and press button below to enable/disable it"
 - Table of rules:

Icon	Code	Name	Description
<input checked="" type="checkbox"/>	Test_	Test_AppParse_XMLRule	Test Rule xml
<input checked="" type="checkbox"/>	TEST	Sample Rule	This is a description of the sample rule
<input checked="" type="checkbox"/>	RANGE	Range Notifications	Add notifications according to configured vitals limits
<input checked="" type="checkbox"/>	EXP	Expression Notifications	Add notifications according to mathematical expressions.
<input type="checkbox"/>	EWS	EWS	Generate notifications according to an automatic computed early warning score
<input type="checkbox"/>	RRR	RangeRuleTest	
 - Buttons: "Press here to ENABLE rule" (highlighted with a red arrow), "Configure other beds"
 - Section: "Configure settings for rule Sample Rule for patient Doe, John"
 - Parameter One:
 - Parameter Two: [-21,4 , 32,7]
 - Parameter Three: [-21 , 33]
 - Parameter Four:
 - Parameter Five:
 - Parameter Test: [-21 , 33]
 - Buttons: "Restore default settings", "Copy settings to other beds"

Lijst van actieve rules per patiënt

Lijst van geconfigureerde te gebruiken rules

Inschakelen/uitschakelen rule voor huidige patiënt

Instellingen van de geselecteerde rule


CDSS configuratie – grenswaarden toepassen

Rule op basis van Thresholds

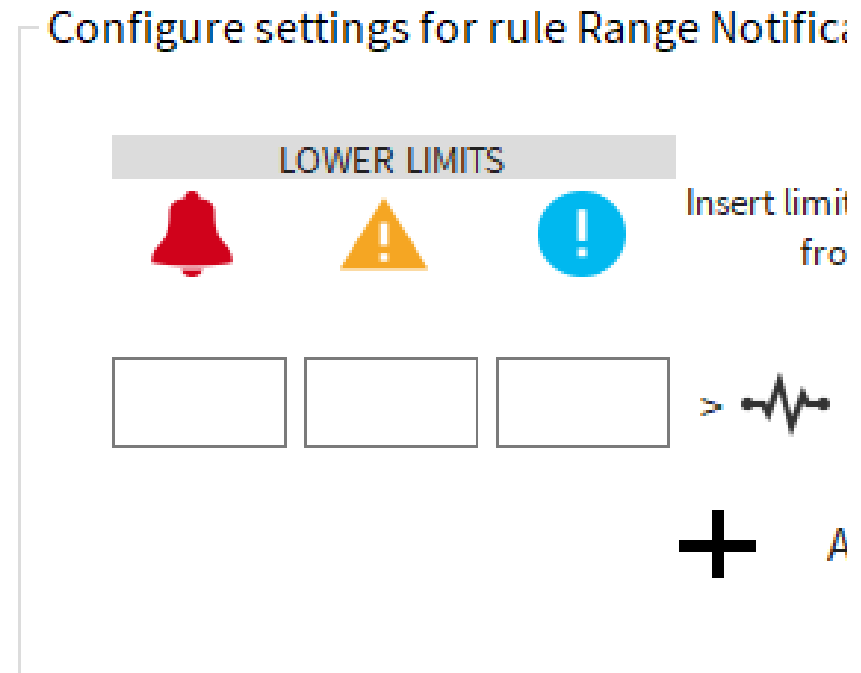
Configure settings for rule Range Notific:

LOWER LIMITS

Insert limit from

> 


+ A



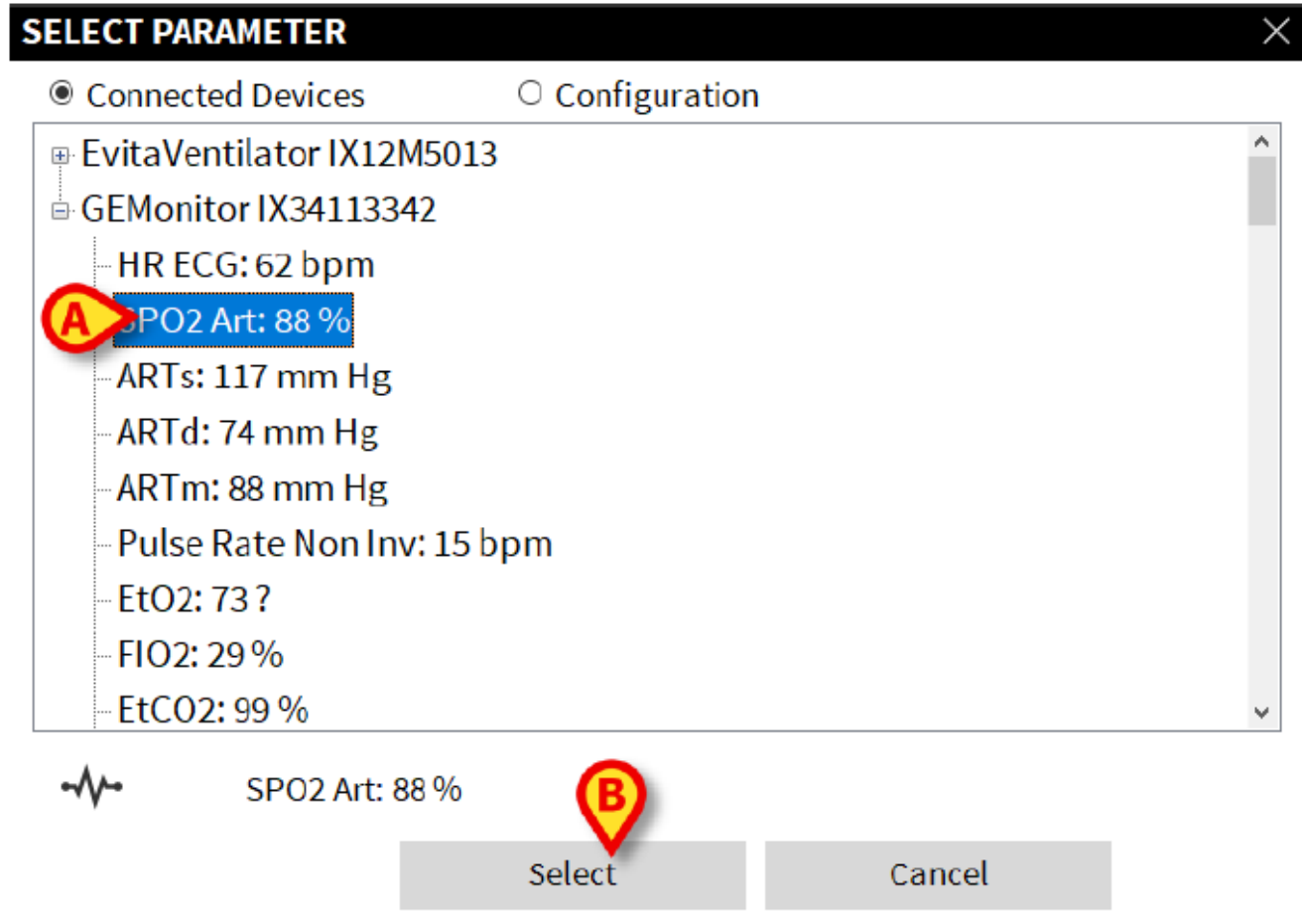
SELECT PARAMETER

Connected Devices Configuration

- EvitaVentilator IX12M5013
- GEMonitor IX34113342
 - HR ECG: 62 bpm
 - SPO2 Art: 88 %**
 - ARTs: 117 mm Hg
 - ARTd: 74 mm Hg
 - ARTm: 88 mm Hg
 - Pulse Rate Non Inv: 15 bpm
 - EtO2: 73 ?
 - FIO2: 29 %
 - EtCO2: 99 %

 SPO2 Art: 88 %

Select Cancel




- Voeg 1 tot 6 verschillende thresholds per parameter toe. Selecteer elke parameter van elk medisch apparaat.

CDSS configuratie – diepgaande mogelijkheden

Rule op basis van Expressies


Configure settings for rule Expression Notifications for patient Doe, John

CONDITIONAL AND OR () HR ECG>140 bpm AND Temp Core>38 °C AND SPO2 Art<93 % 

HR ECG>140 bpm AND Temp Core>38 °C AND SPO2 Art<93 %

Notification Status Notification Level

Notification Message

 Add new expression

- Voeg logische expressies toe en combineer hierin meerdere vitale parameters zodat er volledig aanpasbare notifiaties ontstaan.

CDSS configuratie - NEWS

Rule op basis van een National Early Warning Score (NEWS)

Configure settings for rule EWS for patient Doe, John

	3	2	1	0	1	2	3
Respir. Rate (bpm)	-2		-1 1	2 20		21 24	25
Oxygen Saturation	91	92 93	94 95	96			
Temperature (°C)	35		35,1 36	36,1 38	38,1 39	39,1	
Systolic BP (mmHg)	90	91 100	101 110	111 219			
Heart Rate (bpm)	40		41 50	51 90	91 110	111 130	131

Supplemental Oxygen

Level of consciousness

- Verander EWS thresholds per patiënt
- Voeg zelf parameters toe

Hoe kunnen rules worden uitgebreid? Voorbeeld:

Voeg een nieuwe rule toe in enkele stappen

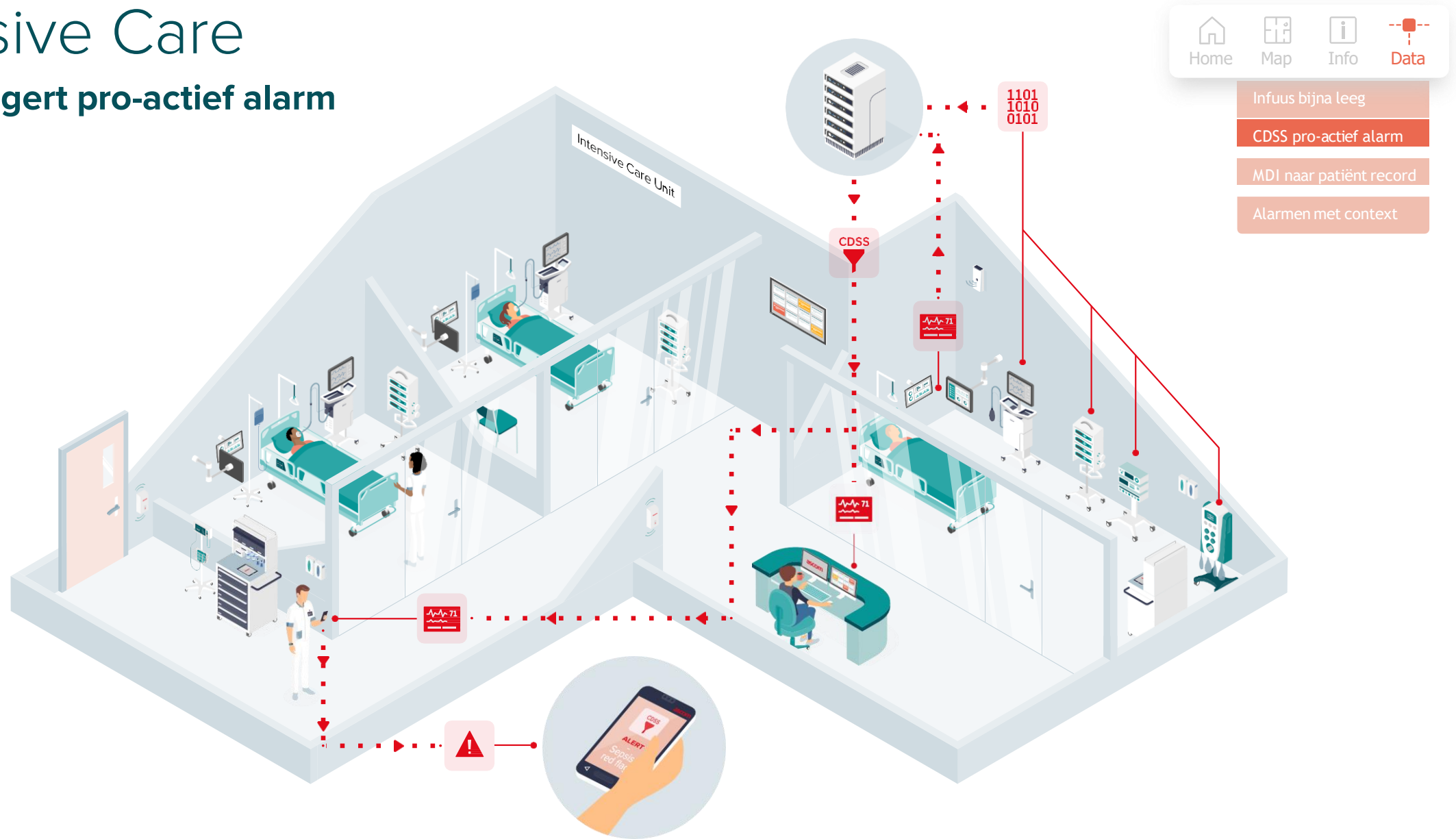
qSOFA index
zichtbaar

The screenshot displays the SMART CENTRAL interface for patient Doe, John. The top navigation bar includes 'DIGISTAT', patient information (DOE, JOHN, BirthDate: 18 ott 1979, Code: FRATELLOMETALLO2, POD: 5), and unit information (ICU01 TBED). The main content area is split into two panels. The left panel shows patient data under the 'qSOFA' tab, including 'CDSS CDSS qSOFA' with a 'qSOFA INDEX: 1' and 'Time: 23:17', and 'EvitaVentilator Evita 4 IX12M5013' with various respiratory parameters. The right panel is titled 'Select a rule and press button below to enable/disable it' and contains a list of rules: CAR1 Carlo Test Rule, LOCL TESTLOC, EWSC EWS for Carlo, EXXX Expr Rule, qSOFA qSOFA (highlighted with a checkmark and the description 'Calculate automatically the qSOFA score'), and WARN Assessment Rule. Below the list are buttons for 'Press here to DISABLE rule' and 'Configure other beds'. A configuration section for the qSOFA rule shows 'GCS' set to '4' with a range of '[-∞, 15]'. At the bottom of the right panel are buttons for 'Restore default settings' and 'Copy settings to other beds'.

qSOFA rule
beschikbaar en
configureerbaar

Intensive Care

CDSS triggert pro-actief alarm



Samengevat: waarom CDSS?

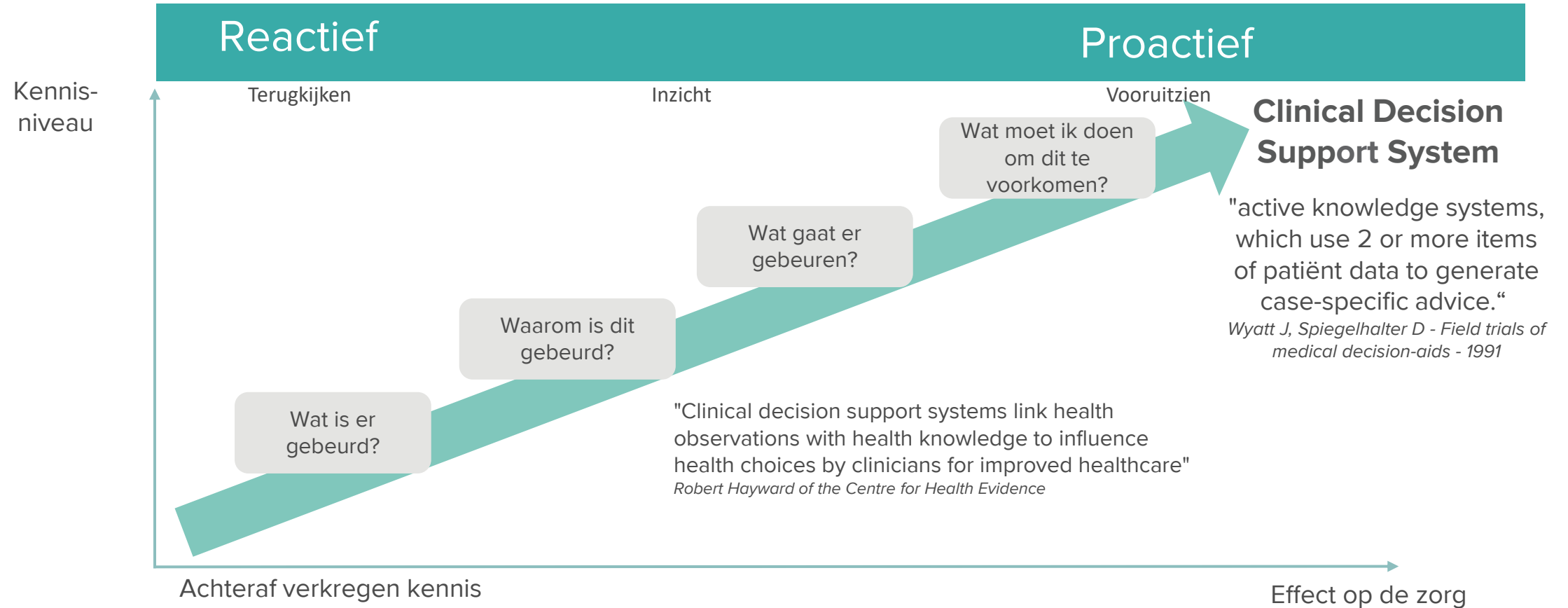
Takeaways

- Proactieve interventie(s)
- Integratie is voorwaarde
- Data en events zichtbaar maken
- Wat doe je met de data? 'Offline' en 'online' data
- Eén app, één overzicht
- Zelf rules samenstellen



Van reactief naar proactief

Zorg ondersteunen met een vooruitziende aanpak



Bron: Gartner RTHS 2019

Vragen

Vond je dit interessant?

Als afsluiting

- Ascom whitepaper Clinical Decision Support
 - Gedetailleerde uitleg CDSS principe
 - Relevante literatuur ter onderbouwing
- Webinar CDSS eind 2021

Voor verdere vragen kunt u contact opnemen met:

- Jasper.Coppes@ascom.com
- 06 25 03 80 10



<https://www.linkedin.com/in/jaspercoppes/>



Hartelijk dank voor uw aandacht