



“Echo”

De dagelijkse praktijk bij de hemodynamische instabiele patiënt?

Saskia Touwen

**IC-verpleegkundige,
Circulation Practitioner i.o.**

Welkom!



Het BovenIJ ziekenhuis is een algemeen ziekenhuis in Amsterdam-Noord met 313 bedden.

- Combinatie afdeling Intensive Care & Cardiac Care
- Niveau 1 IC
- 12 bedden, 6 beademingsplaatsen



Inleiding

Probleem, doel- & vraagstelling

Onderzoeksmethode

Resultaat

Conclusie & Aanbevelingen

Rol Circulation Practitioner

Inleiding

Inleiding

- Hypovolemie



Inleiding

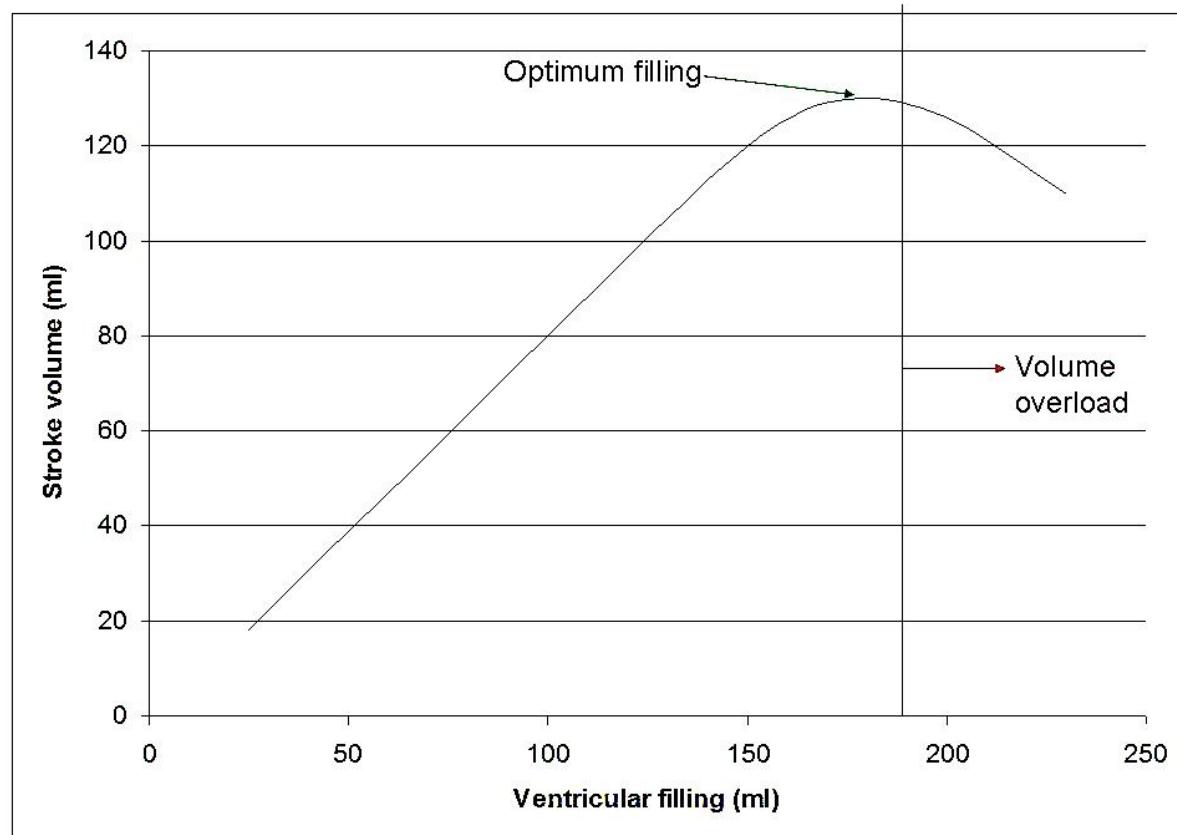
- Hypervolemie



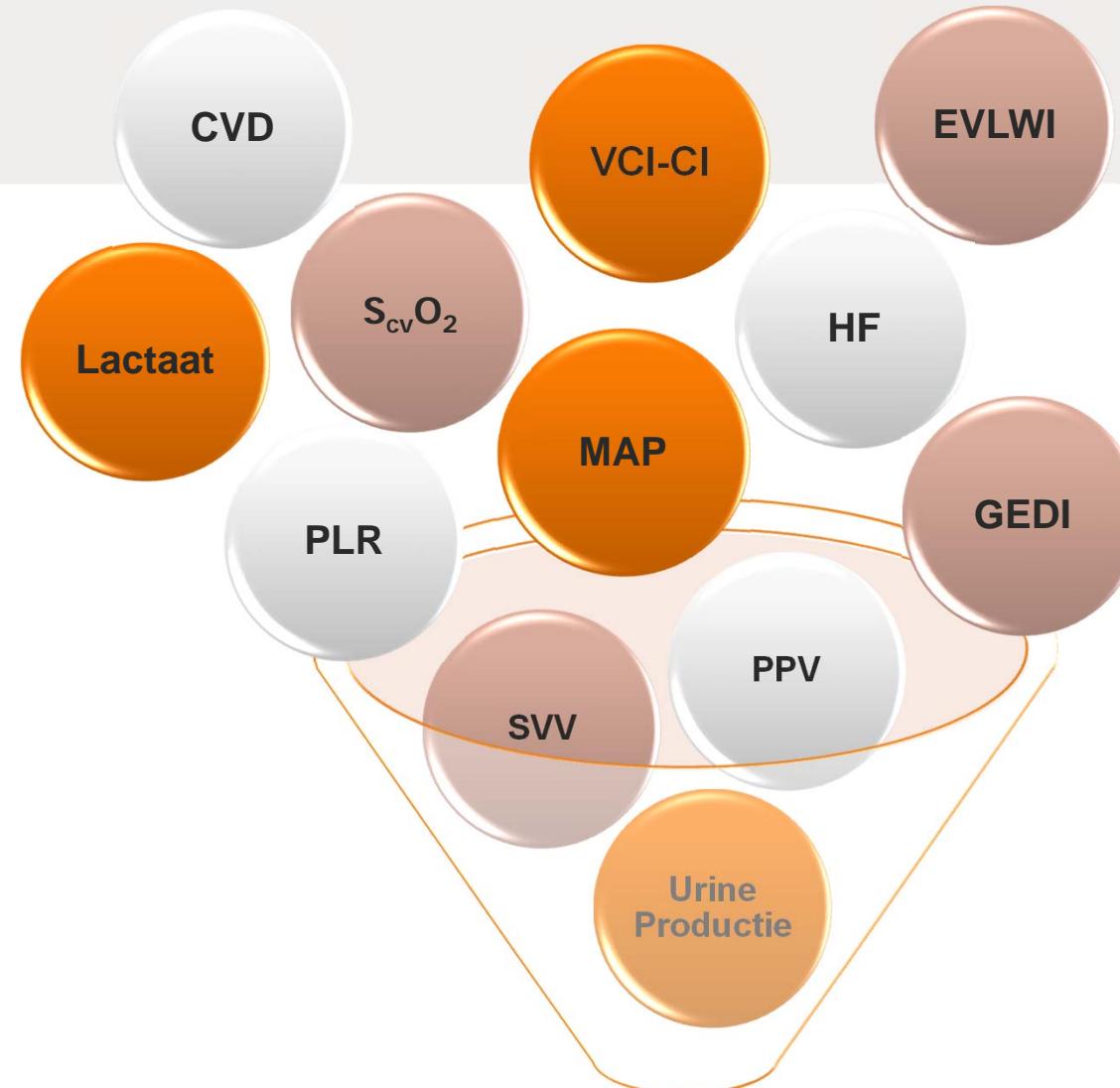
K.Selway

Frank-Starling Law of the Heart

- Preload
- Afterload
- Contractility

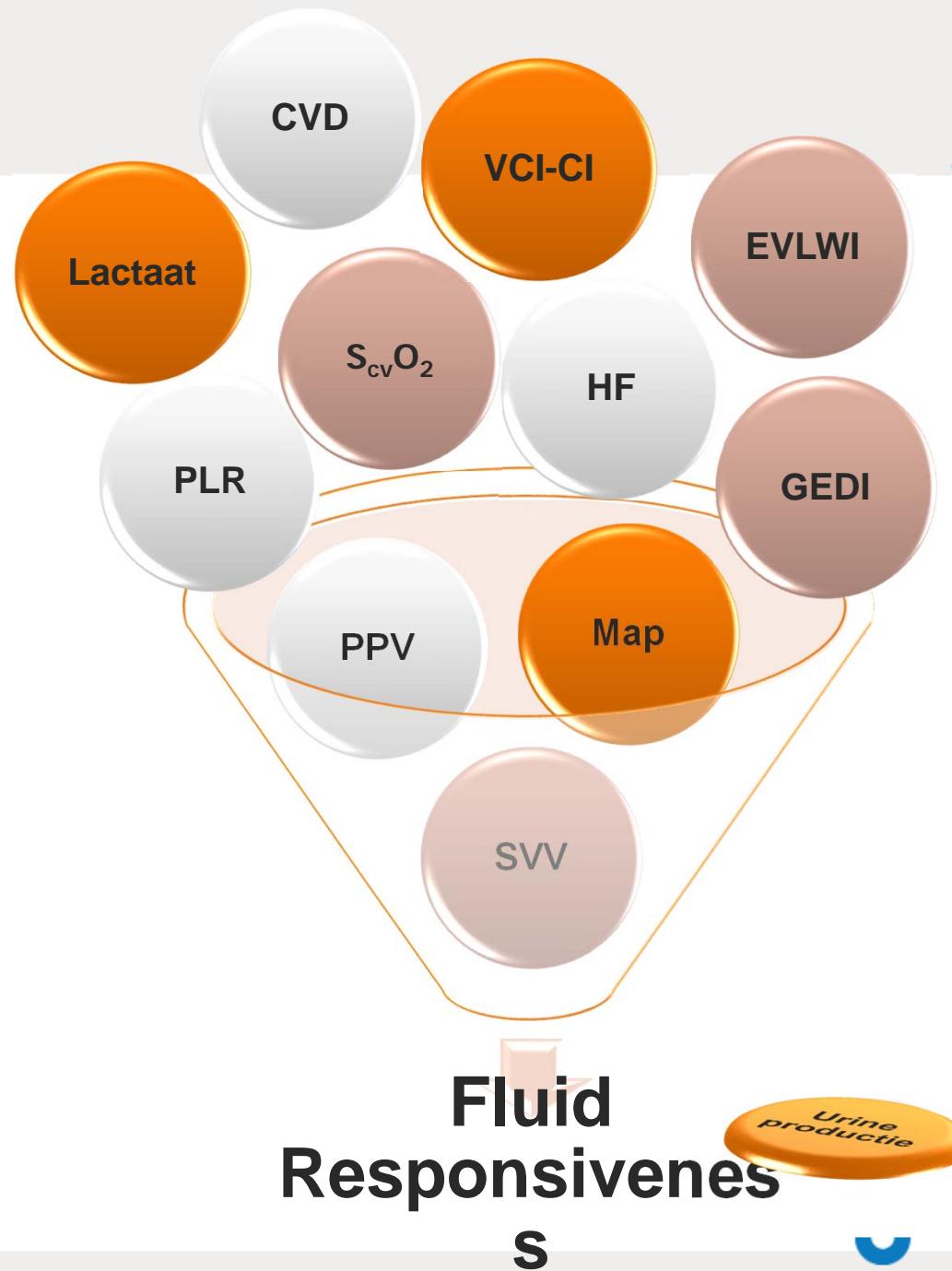


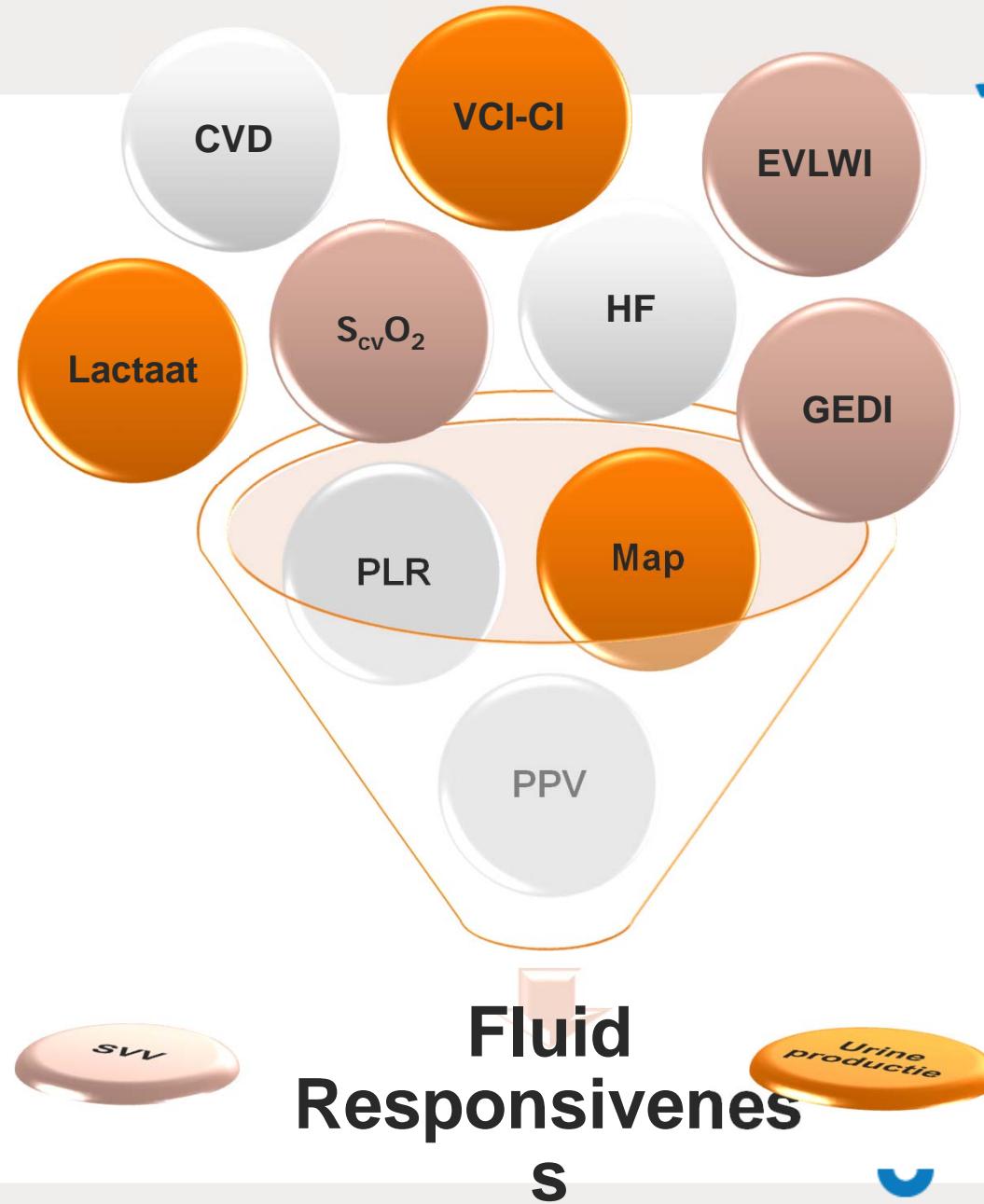
A. Ochagavía: Evaluation of contractility and postloading in the intensive care unit

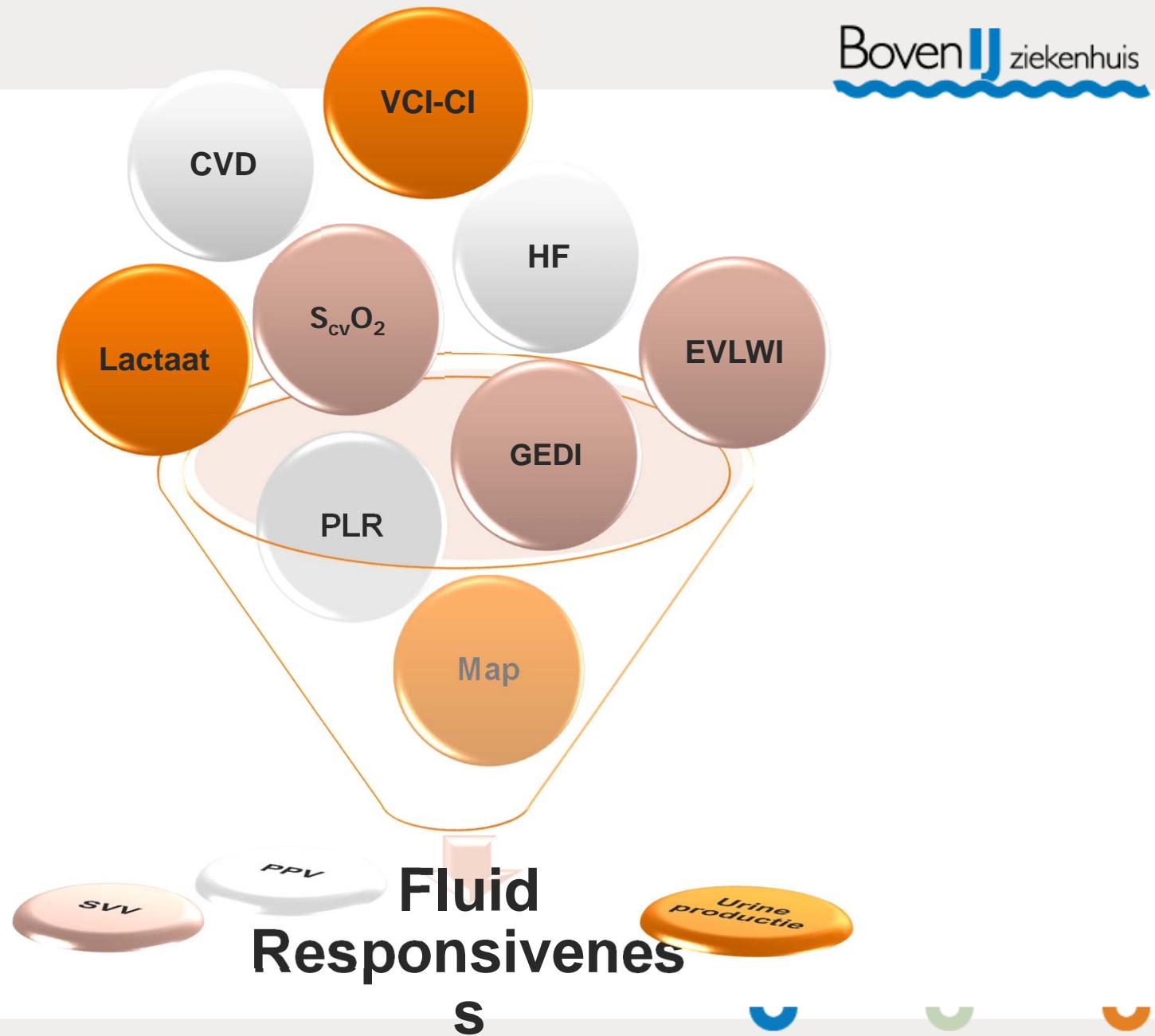


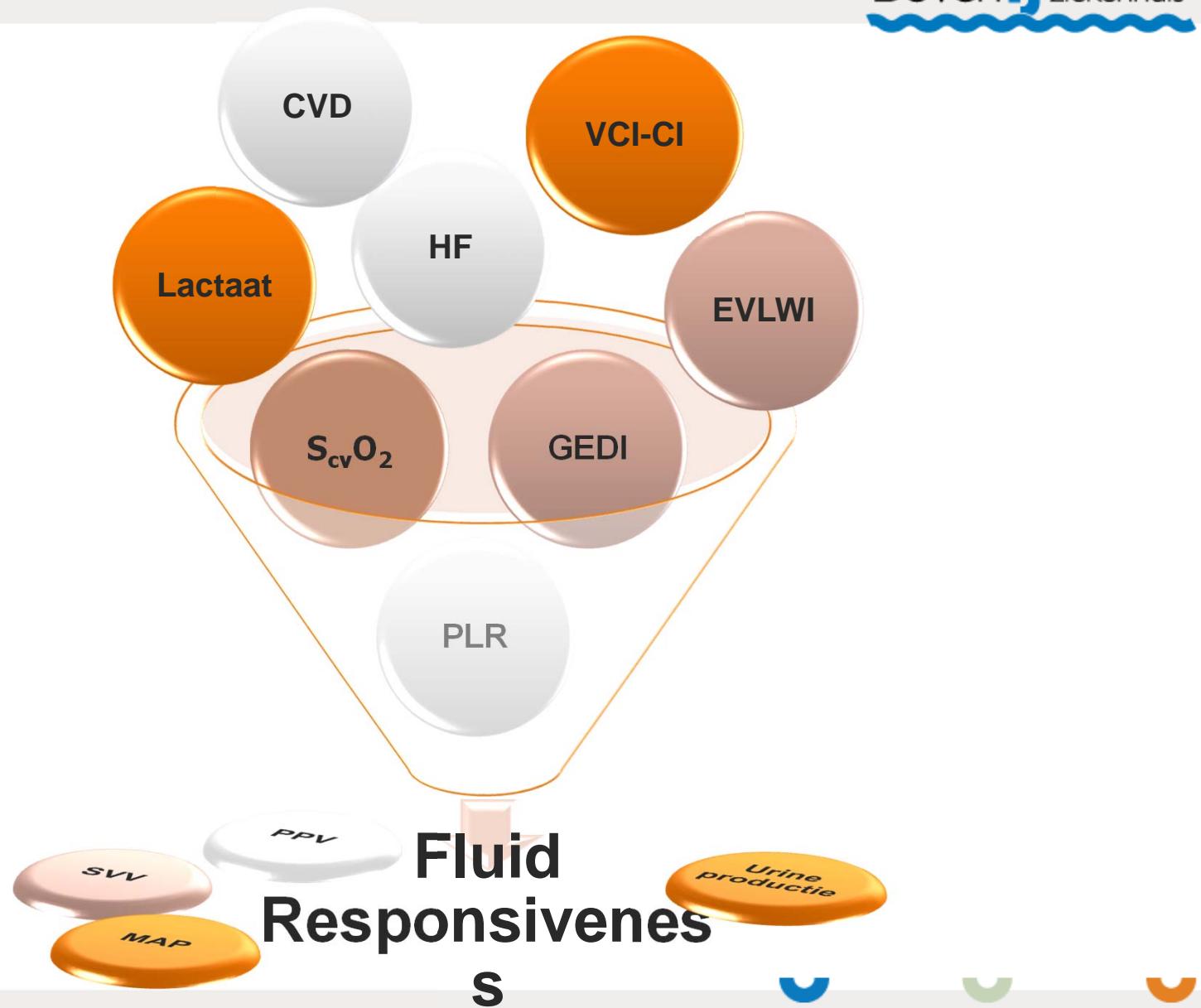
Fluid Responsiveness

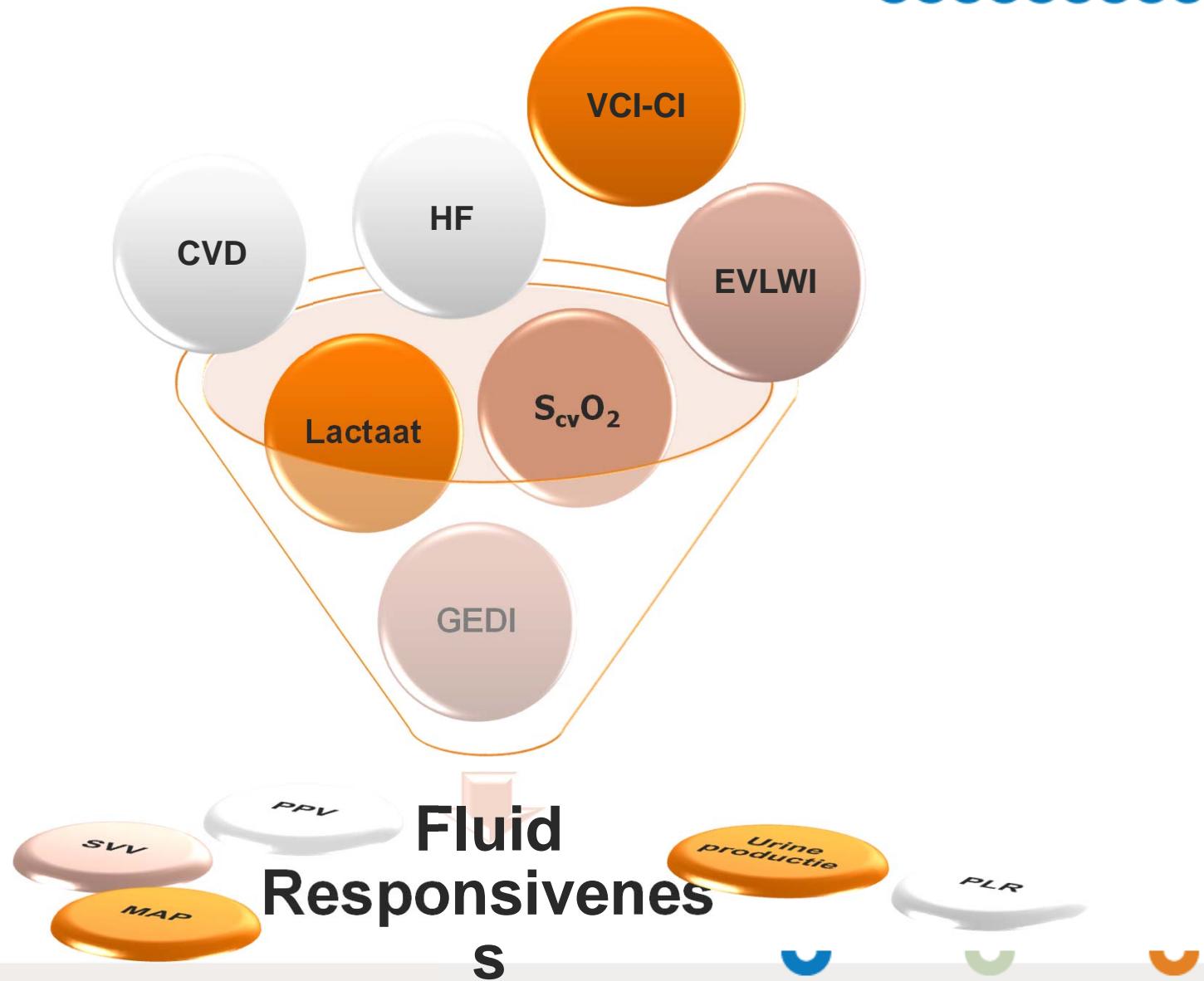
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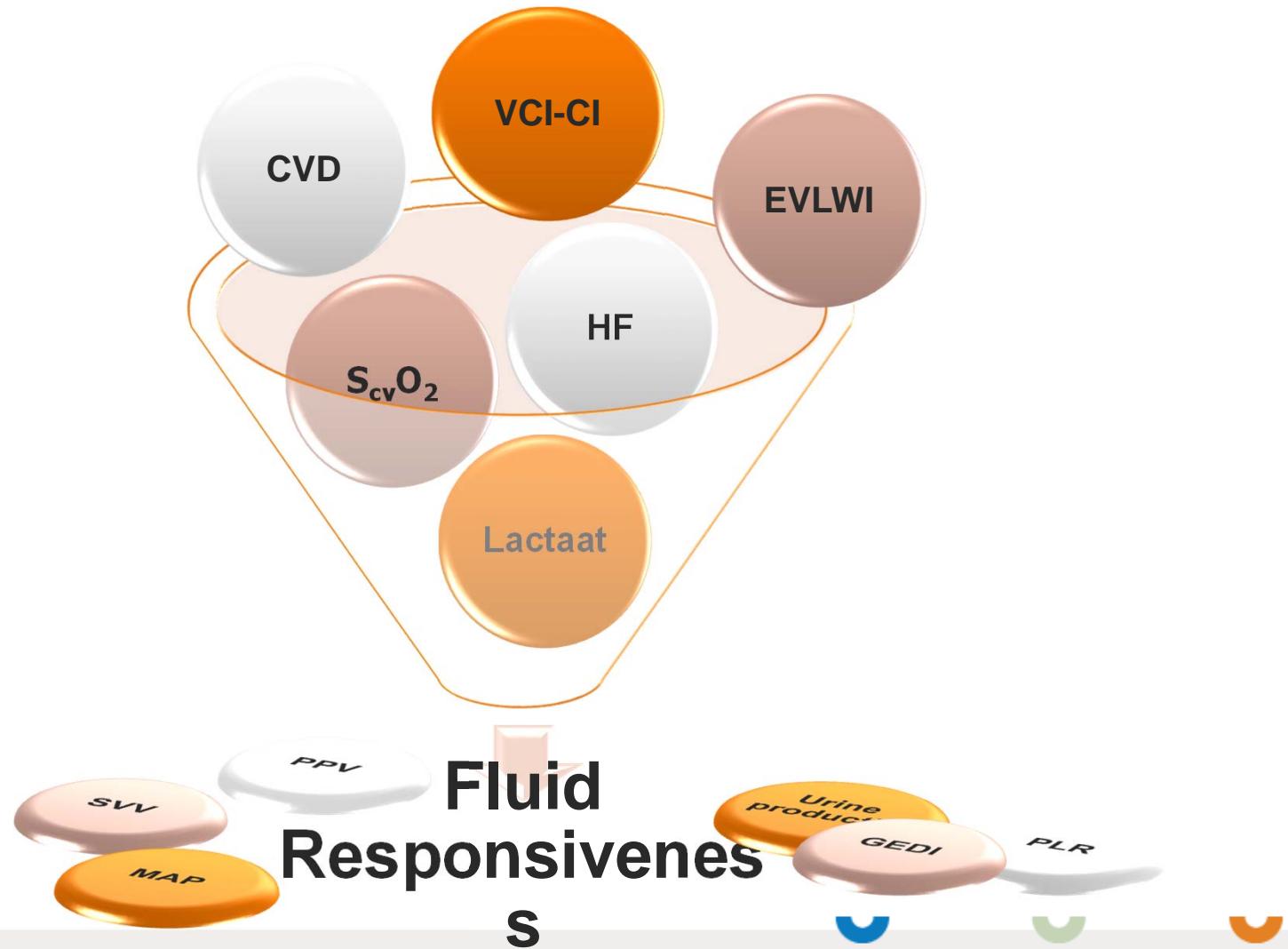


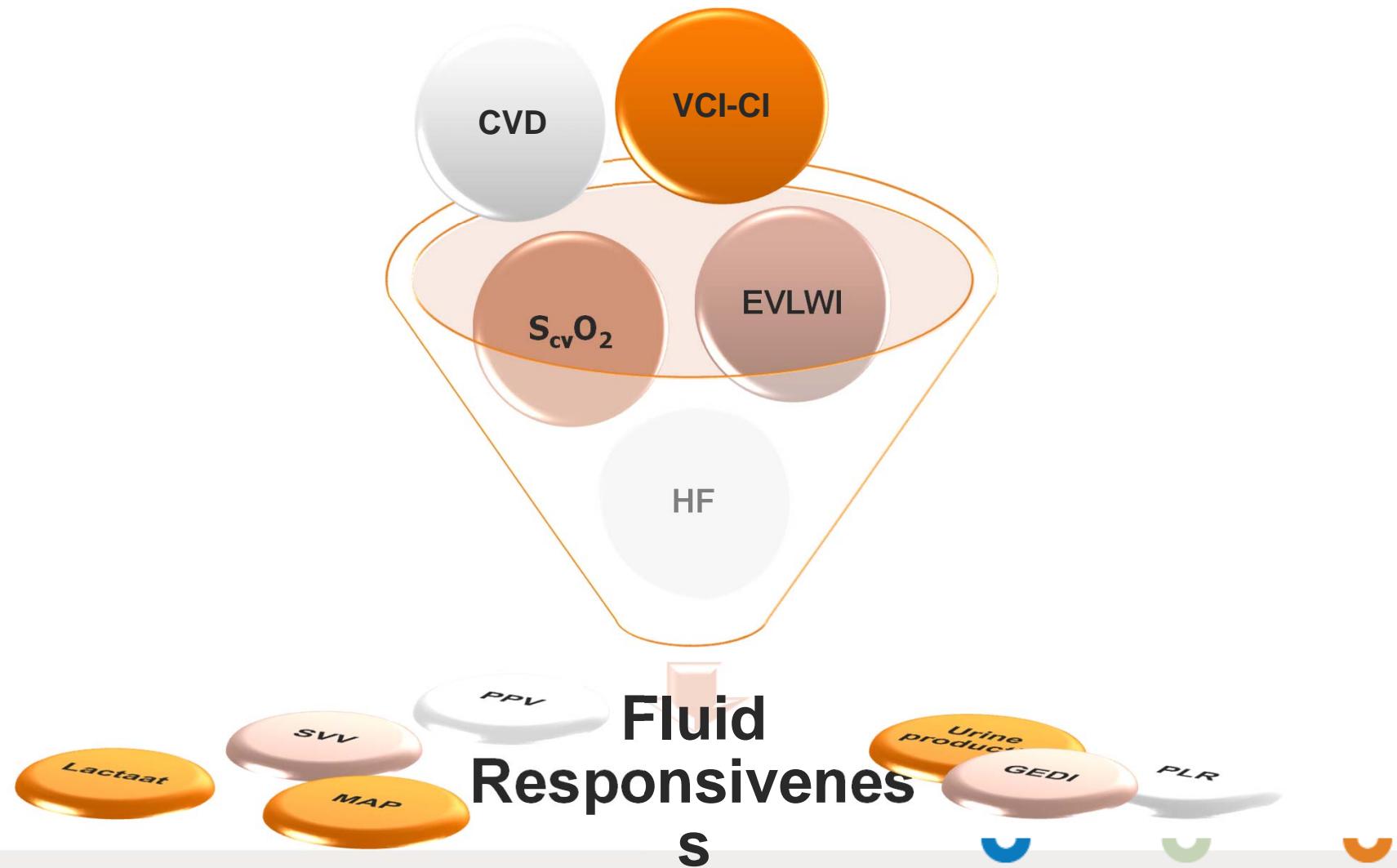


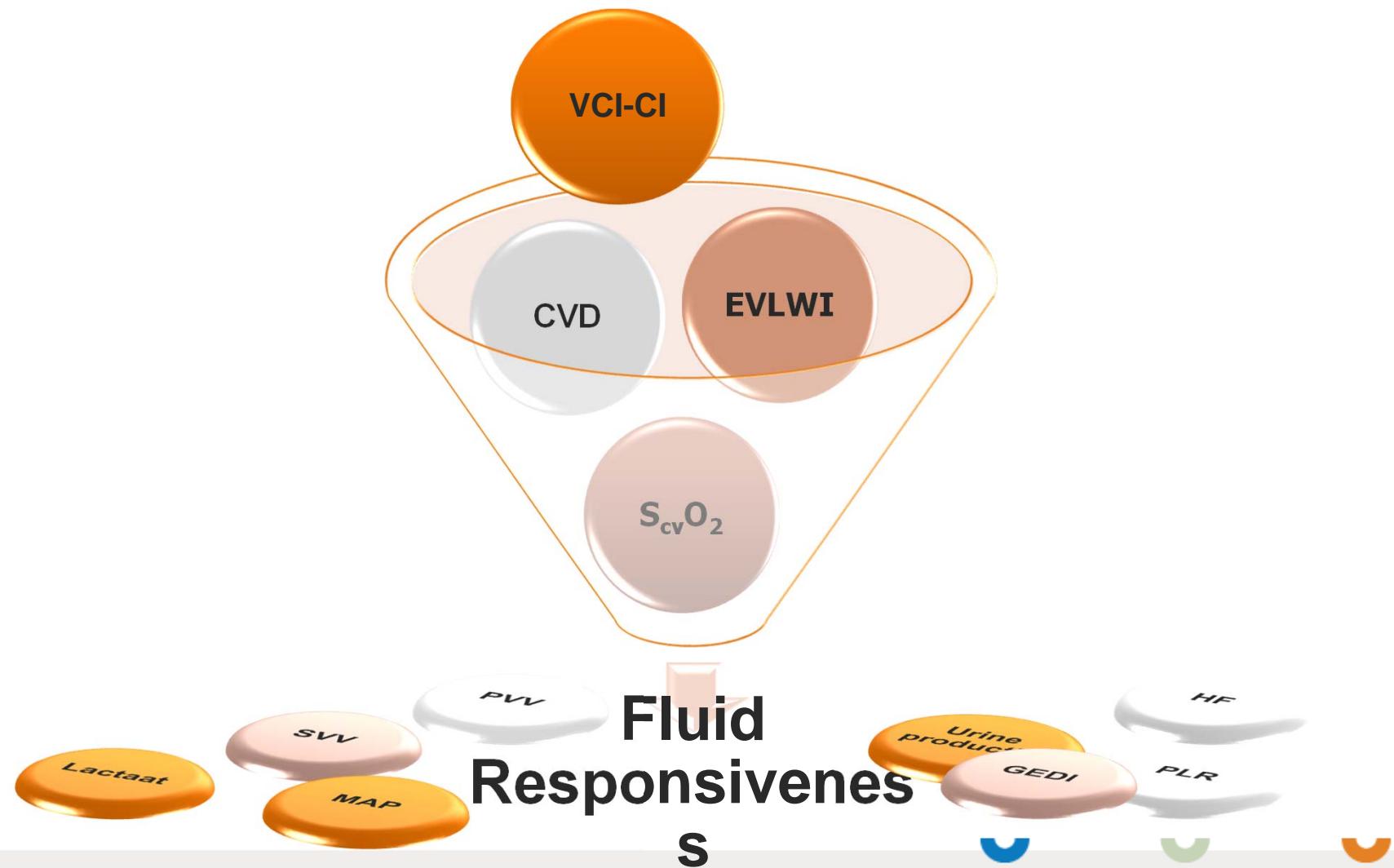


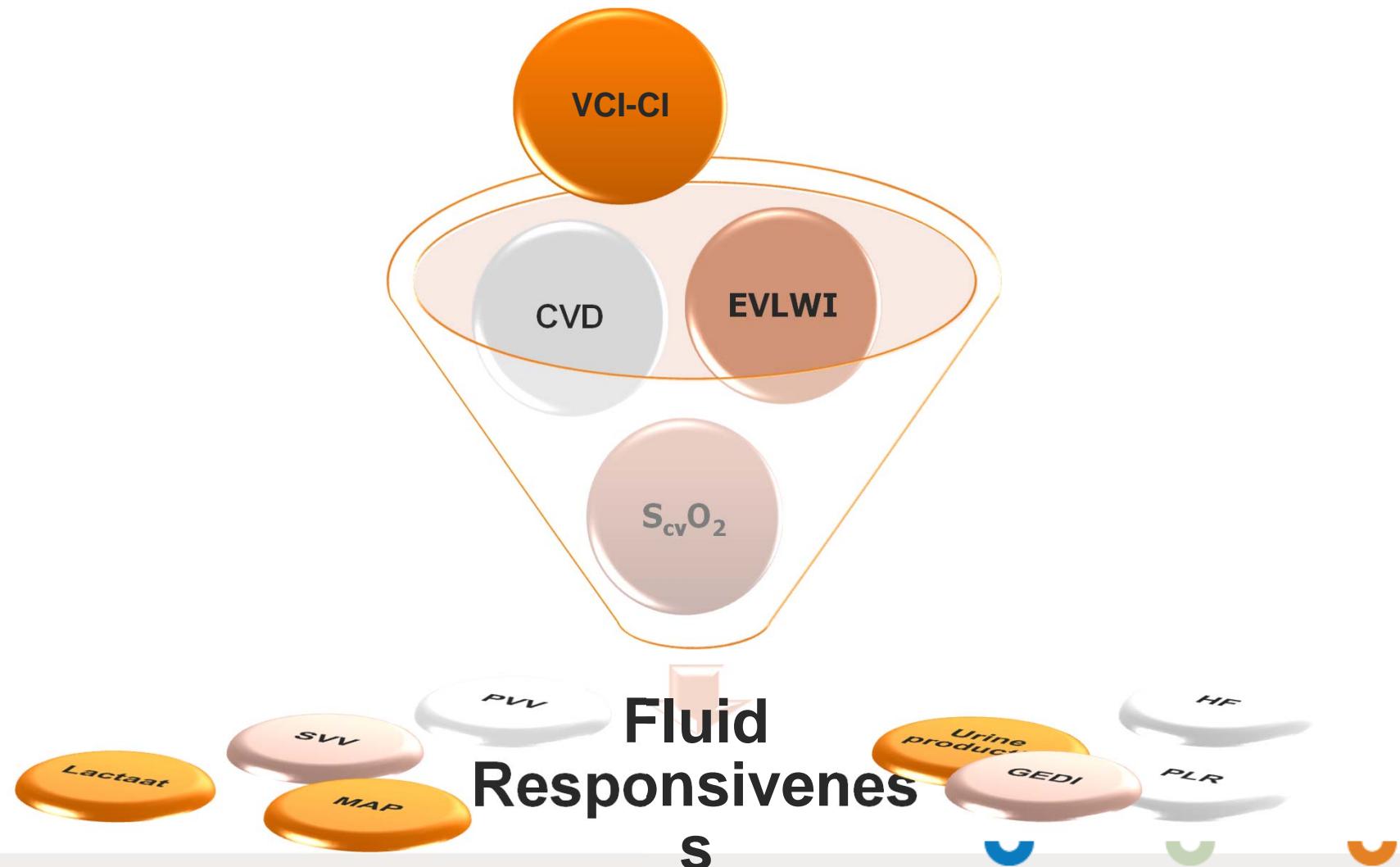


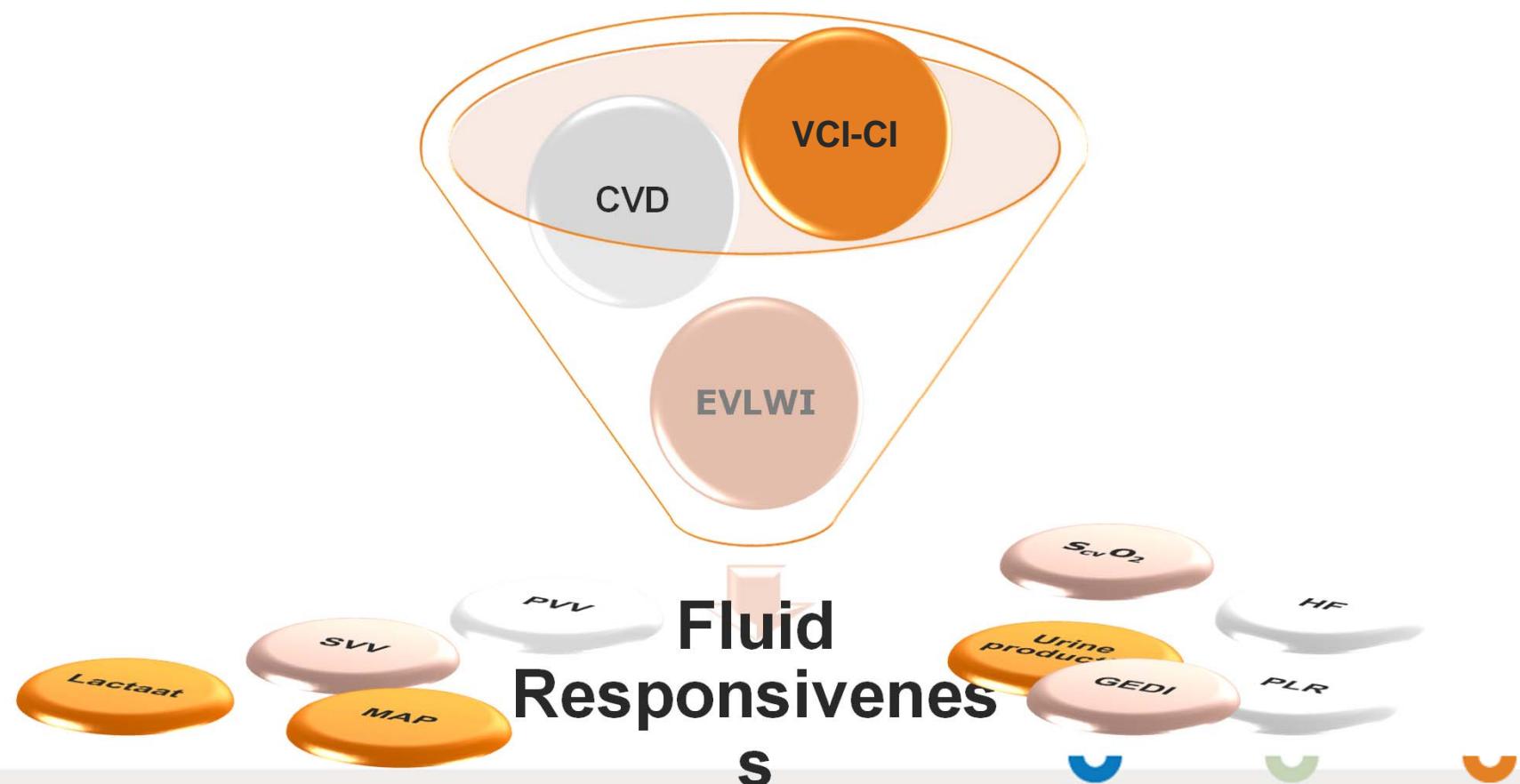


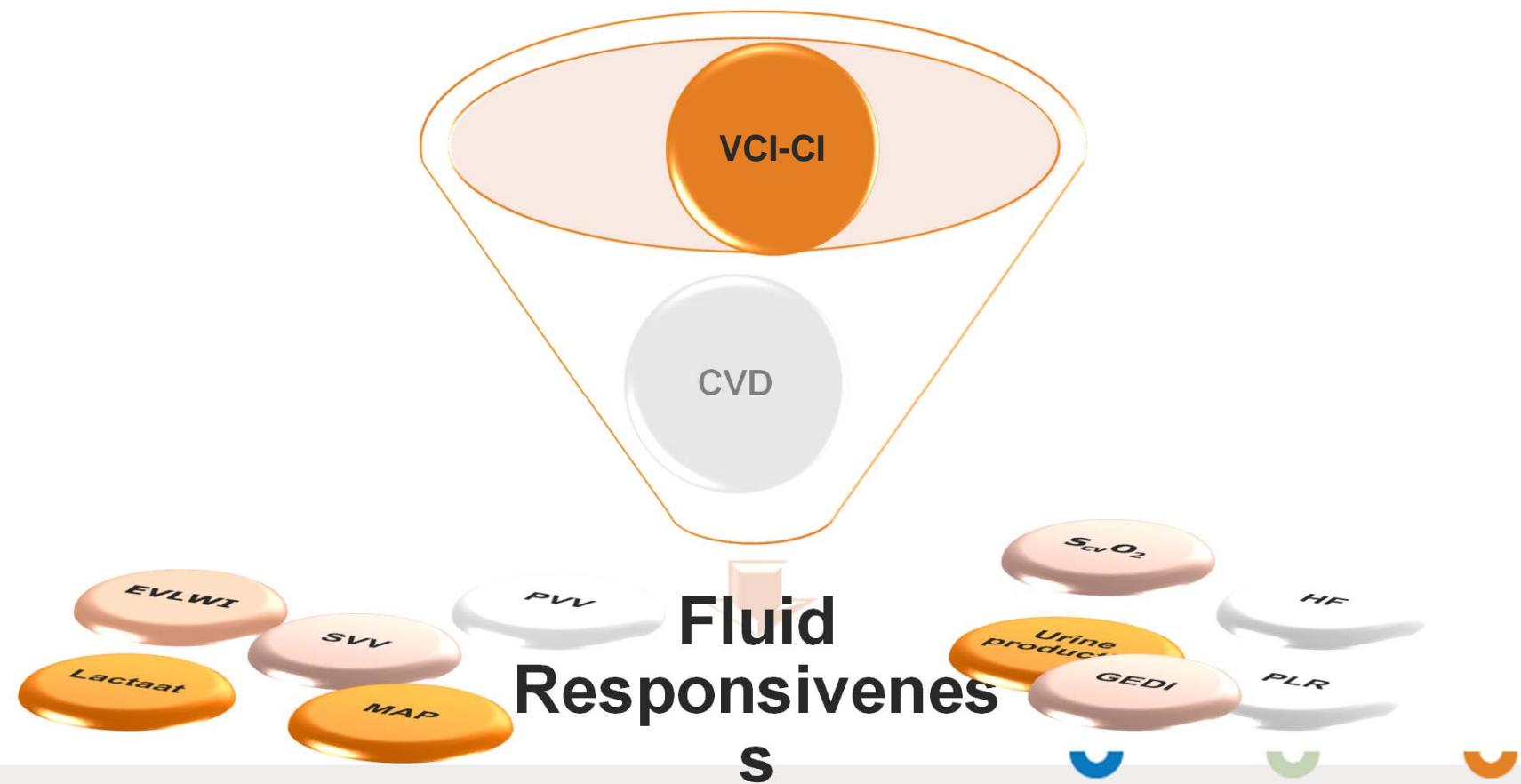


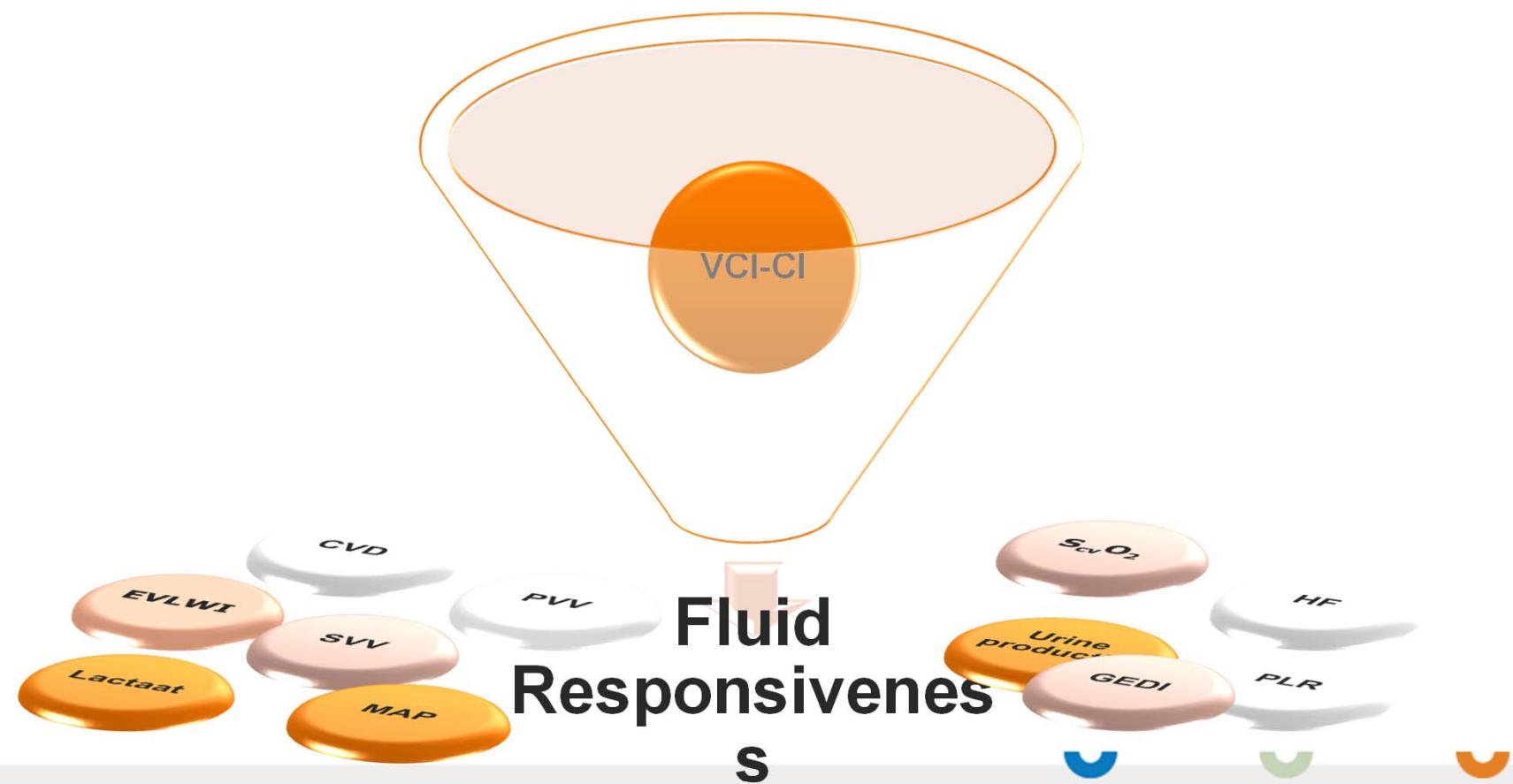


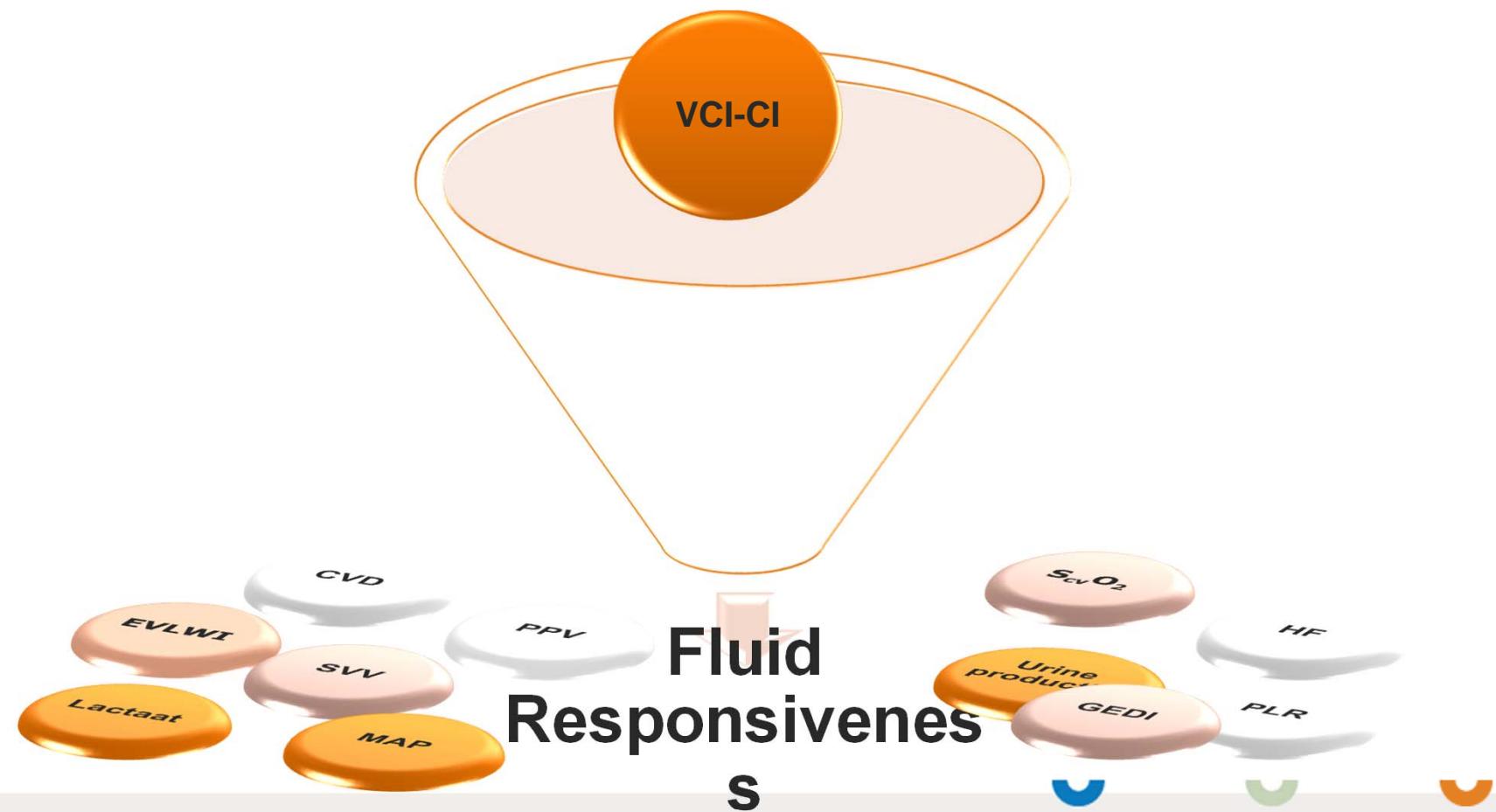






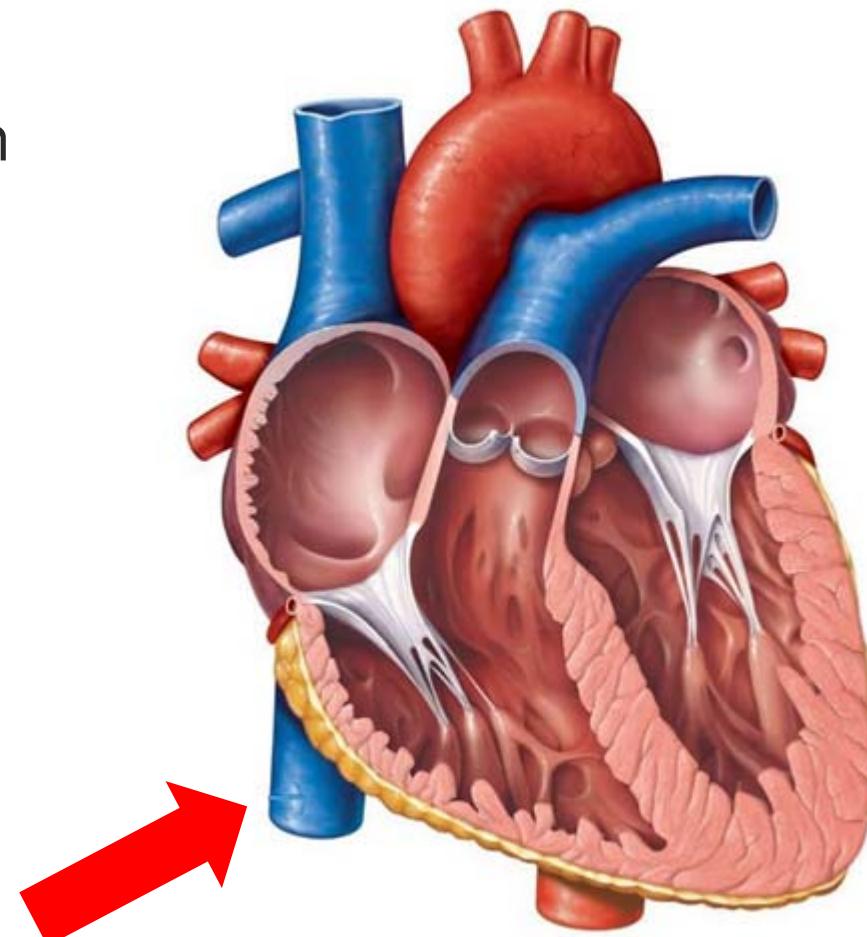






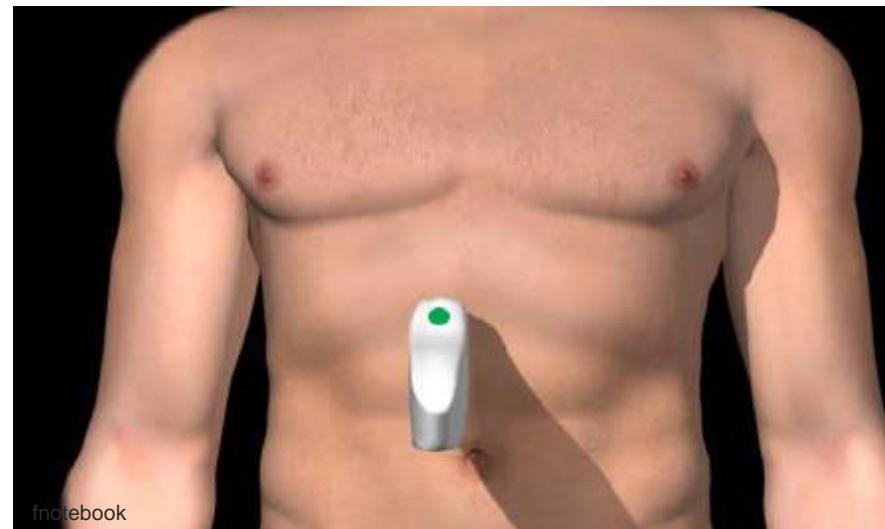
Vena Cava Inferior (vCI)

- Diameter: 1,5 – 2,5 cm
- Compliante vene
- Ademhalingscyclus

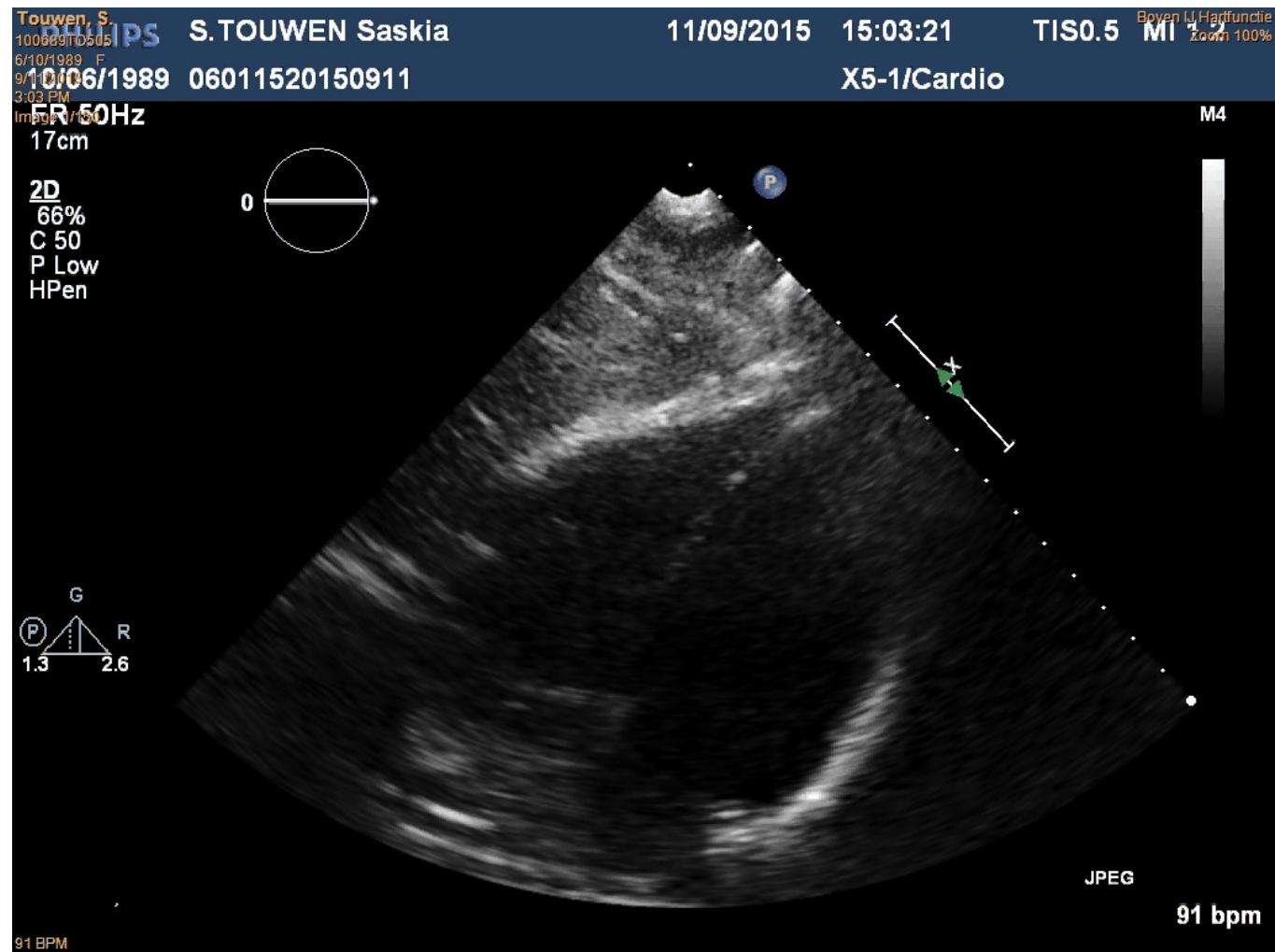


VCI-CI meting

- Subcostale view
- Subxyphoïd
- M-mode



Subcostale view



VCI

Touwen, S.
100669T0505
6/10/1989 F
9/10/2015
3:07 PM
Image View
FR 50Hz

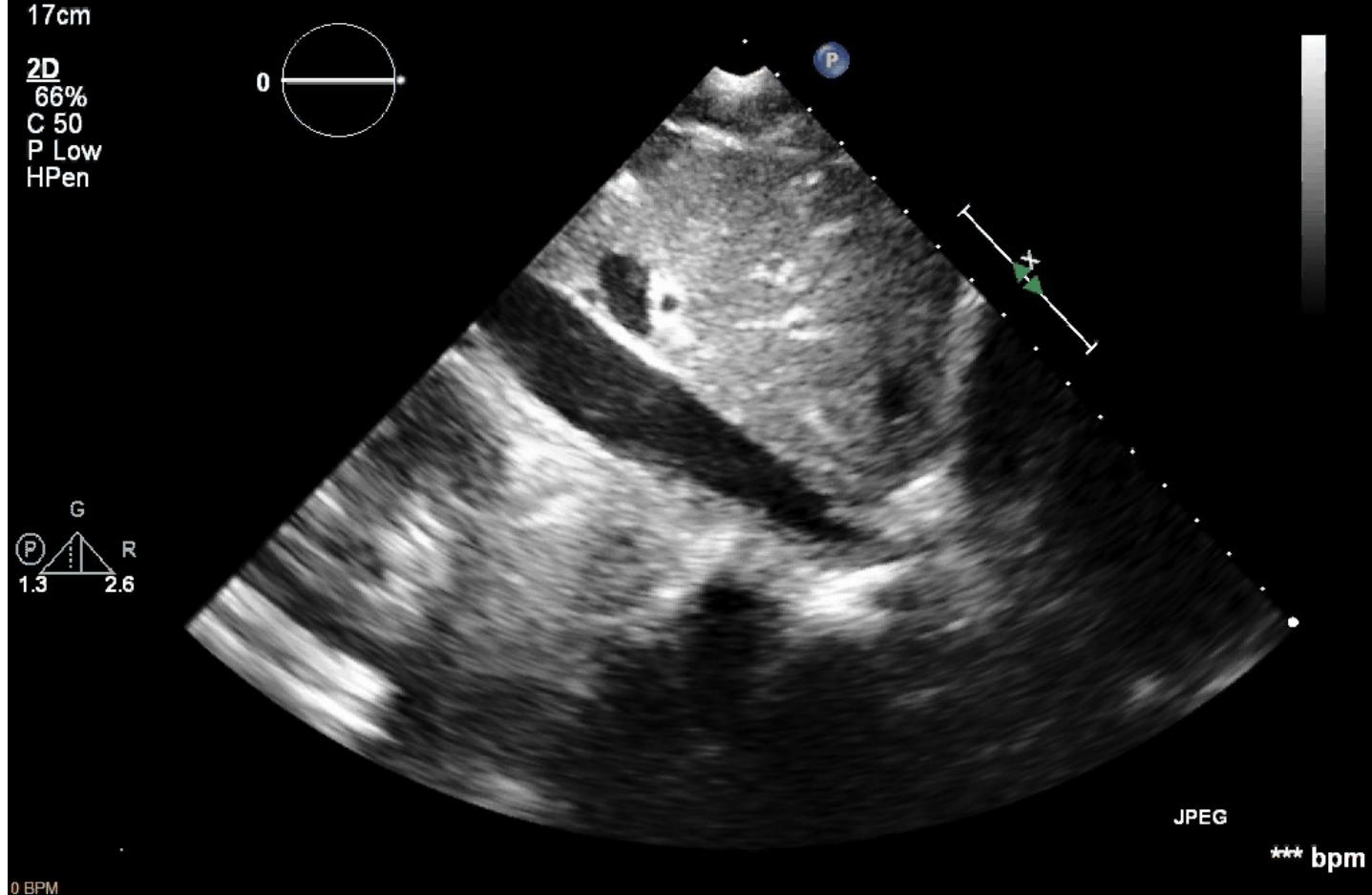
17cm
2D
66%
C 50
P Low
HPen

G
P 1.3 R 2.6

0 BPM

11/09/2015 15:07:06 TIS0.5 MI 1 Boven IJ Hartfondie
Zoom 100%
X5-1/Cardio

M4



Vena Cava Inferior - Collaps Index berekening

- 0% - 50% goede vullingstatus
- >50% ondervulling

Caval index (CI)

maximum diameter - minimal diameter

$$CI = \frac{\text{maximum diameter} - \text{minimal diameter}}{\text{maximum diameter}} \times 100$$



Literatuur

- Veilig
- Snel
- Non-invasief



ELSEVIER

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● Review

ULTRASONOGRAPHIC MEASUREMENT OF THE RESPIRATORY VARIATION IN THE INFERIOR VENA CAVA DIAMETER IS PREDICTIVE OF FLUID RESPONSIVENESS IN CRITICALLY ILL PATIENTS: SYSTEMATIC REVIEW AND META-ANALYSIS

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Abstract—Respiratory variation in the inferior vena cava (Δ IVC) has been extensively studied with respect to its value in predicting fluid responsiveness, but the results are conflicting. This systematic review was aimed at investigating the diagnostic accuracy of Δ IVC in predicting fluid responsiveness. Databases including Medline, Embase, Scopus and Web of Knowledge were searched from inception to May 2013. Studies exploring the diagnostic performance of Δ IVC in predicting fluid responsiveness were included. To allow for more between- and within-study variance, a hierarchical summary receiver operating characteristic model was used to pool the results. Subgroup analyses were performed for patients on mechanical ventilation, spontaneously breathing patients and those challenged with colloids and crystalloids. A total of 8 studies involving 235 patients were eligible for analysis. Cutoff values of Δ IVC varied across studies, ranging from 12% to 40%. The pooled sensitivity and specificity in the overall population were 0.76 (95% confidence interval [CI]: 0.61–0.86) and 0.86 (95% CI: 0.69–0.95), respectively. The pooled diagnostic odds ratio (DOR) was 20.2 (95% CI: 6.1–67.1). The diagnostic performance of Δ IVC appeared to be better in patients on mechanical ventilation than in spontaneously breathing patients (DOR: 30.8 vs. 13.2). The pooled area under the receiver operating characteristic curve was 0.84 (95% CI: 0.79–0.89). Our study indicates that Δ IVC measured with point-of-care ultrasonography is of great value in predicting fluid responsiveness, particularly in patients on controlled mechanical ventilation and those resuscitated with colloids. (E-mail: zh_zhang1984@hotmail.com) © 2014 World Federation for Ultrasound in Medicine & Biology.

Key Words: Fluid responsiveness, Ultrasonography, Variation in inferior vena cava, Critical illness, Mechanical ventilation, Meta-analysis.

Inleiding

Probleem, doel- & vraagstelling

Probleemstelling

- Om de vullingsstatus van de patiënt op de IC van het BovenIJ ziekenhuis in kaart te brengen wordt er geen gebruik gemaakt van een bepaalde parameter.

Doelstelling

- Middels onderzoek aantonen dat de VCI-CI duidelijk de vullingsstatus in beeld brengt en dat de verkregen waarden hiervan correleren met de huidige parametrie.

Vraagstelling

- Kan de Vena Cava Inferior - Collaps Index gebruikt worden als parameter, voor het voorspellen van de fluid responsiveness bij Intensive Care patiënten?
- Is er een correlatie tussen de meting van de VCI-CI verkregen met de echo en die van de huidige gebruikte parameters?

Inleiding

Probleem, doel- & vraagstelling

Onderzoeks methode

Onderzoeks methode

- Theorie
- Echocardiografie 3 dagen
- Echografie op de Intensive Care
- Meting van de VCI-Cl



Onderzoeks methode

- Inclusie

- Arterielijn
- Vena Jugularis lijn
of
- Vena Subclavia lijn

- Exclusie

- Leeftijd < 18 jaar
- Leverstuwing
- Rechterventrikel falen
- Abdominale chirurgie
- Zwangeren

Onderzoeks methode

- Echo door de Circulation Practitioner i.o.
- Parametrie
- Handmatig genoteerd & verwerkt in Excel

Inleiding

Probleem, doel- & vraagstelling

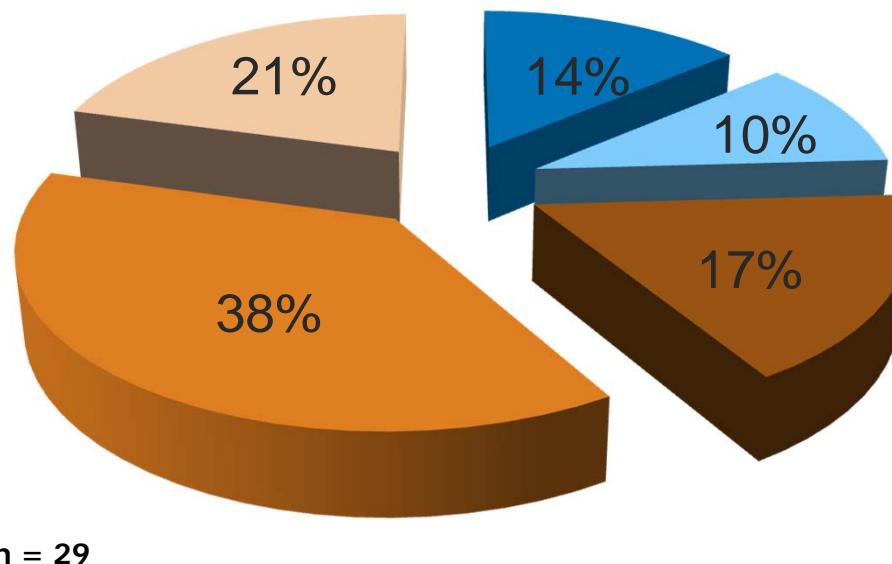
Onderzoeksmethode

Resultaat

Resultaat

Inclusie / exclusie

- Gemist
- Niet in beeld
- Geïncludeerd
- Vena femoralis katheter
- Exclusie criteria



Karakteristieken

Karakteristieken metingen

Man	2 (28,6%)
Vrouw	5 (71,4%)
Leeftijd	74±5 jaar
BMI	25.9±3.7
Noradrenaline	5
Beademd	5

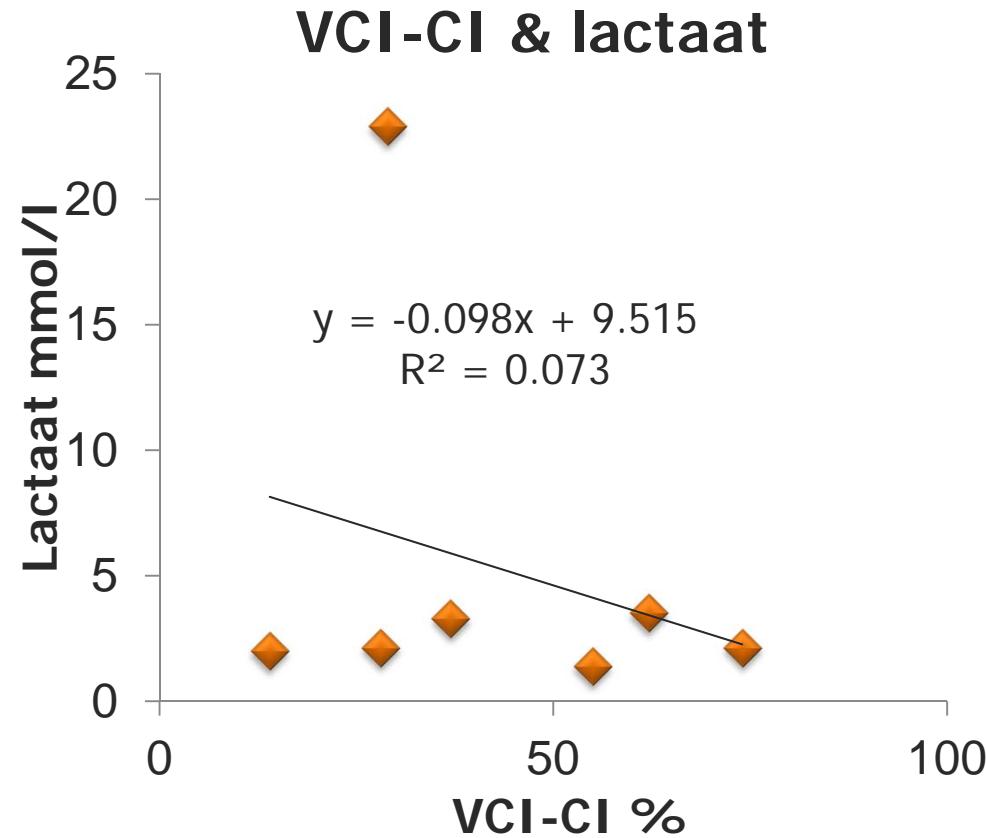
Correlatie

- Lactaat
- $S_{cv}O_2$
- MAP
- Capillaire refill
- Hartfrequentie



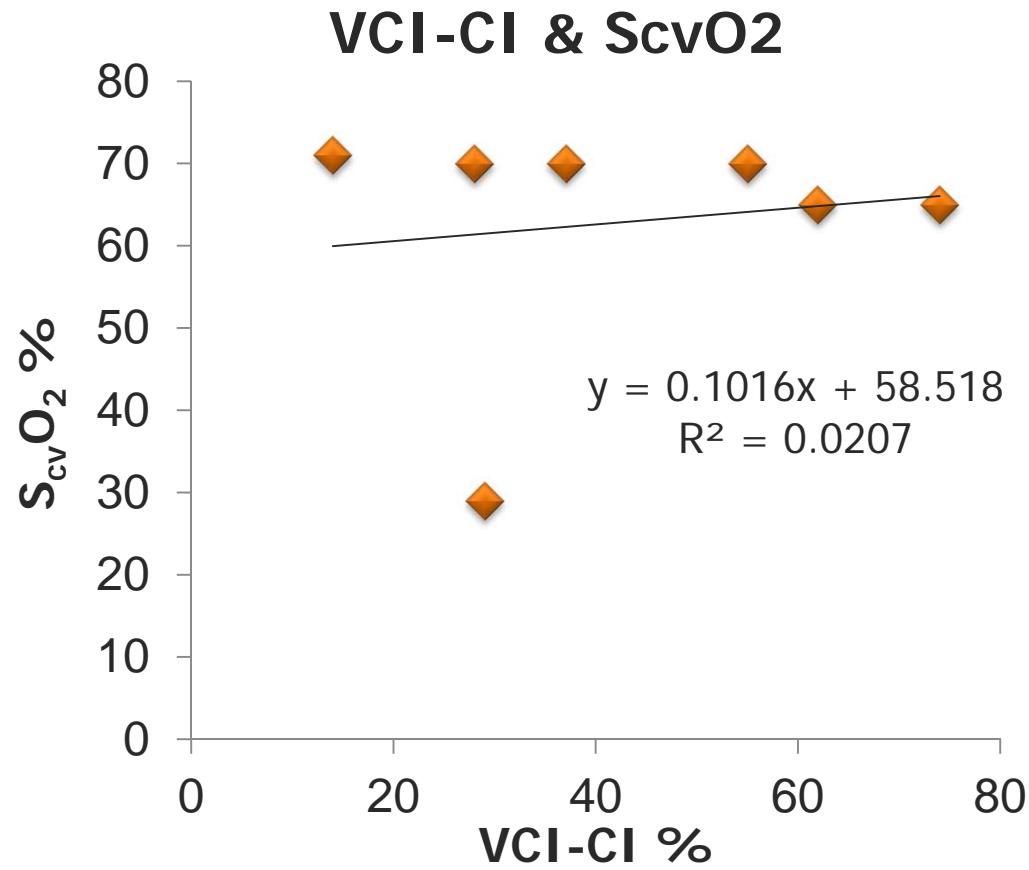
VCI & lactaat

- $r = -0.2702$
- $P = 0.56$



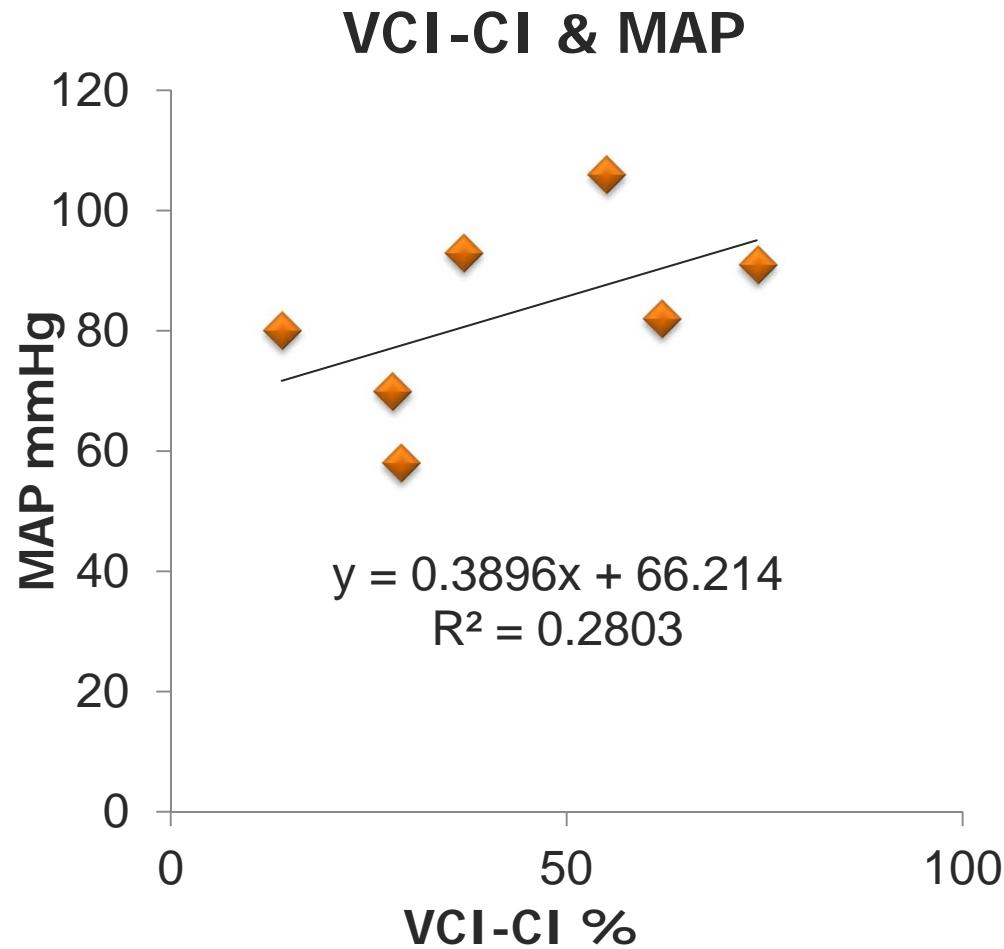
VCI & $S_{cv}O_2$

- $r = 0.1440$
- $P = 0.76$



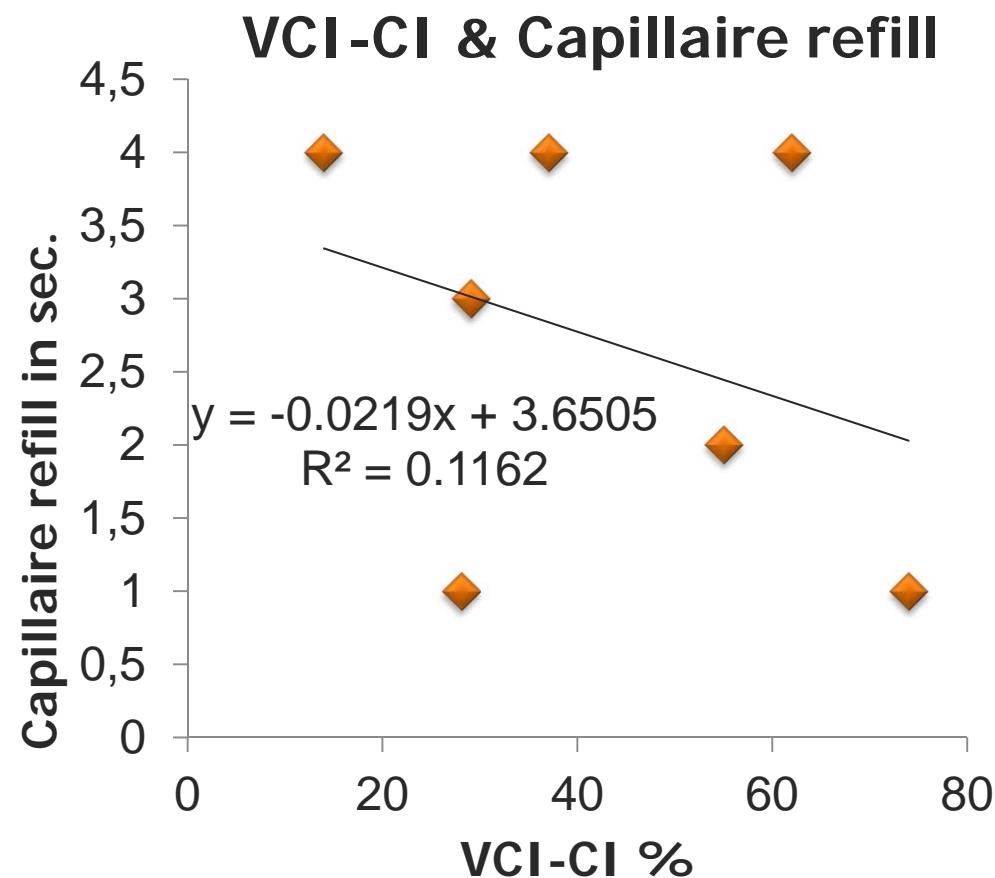
VCI & MAP

- $r = 0.5294$
- $P = 0.22$



VCI & Capillaire refill

- $r = -0.3408$
- $P = 0.45$



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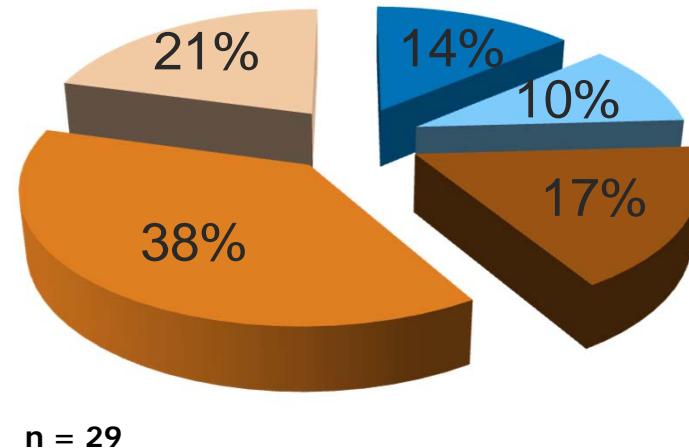


Conclusie

- Zvakke correlatie
- Geen continu parameter

Inclusie / exclusie

- Gemist
- Niet in beeld
- Geïncludeerd
- Vena femoralis katheter



- VCI-Cl door Circulation Practitioner i.o.

Discussie

- Kleine groep
- Exclusie criteria
- Niet te meten
- Vena Femoralis katheter



Aanbevelingen

- Power analyse
- Continue parameter
- Uniforme werkwijze



Inleiding

Probleem, doel- & vraagstelling

Onderzoeks methode

Resultaat

Conclusie & Aanbevelingen

Rol Circulation Practitioner



Rol als Circulation Practitioner



Rol als Circulation Practitioner

- Werkgroep oprichten zowel voor de CC & IC
- Literatuuronderzoek gericht op de praktijk
- Implementatie & innovatie
- Onderwijs
- Echo diagnostiek
- Vakbladen, symposia, congressen & CP netwerk

Afdeling

Rol als Circulation Practitioner

- Advies op verpleegkundig- & medisch niveau
- Scholing aan verpleegkundige & artsen
- Ziekenhuis brede implementatie

Ziekenhuisbreed

Rol als Circulation Practitioner

- Contacten met collega Circulation Practitioners
- Samenwerking
- Contact met de industrie

Regionaal



Dankwoord

- Collega's
 - Melissa Hoogedonk & Richard Dilleman
 - Remko de Jong & Astrid Nijmeijer
 - Danique Jeurissen
-
- Practitioners (i.o)
 - Hans, Rianne & Marian
 - Familie & Vrienden



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