
XIII congresso nazionale
simeu
GENOVA 30 MAG - 1 GIU 2024
I.MEU
I.MEU
SOCIETÀ ITALIANA MEDICINA D'EMERGENZA-URGENZA
SIMEU

Gestione del dolore toracico con algoritmo ESC 0/1-h: L'esperienza integrata hub-spoke di AULSS1 Dolomiti

Dott. Davide Dalla Palma
UOC Pronto Soccorso
Ospedale Santa Maria del Prato Aulss 1 Dolomiti

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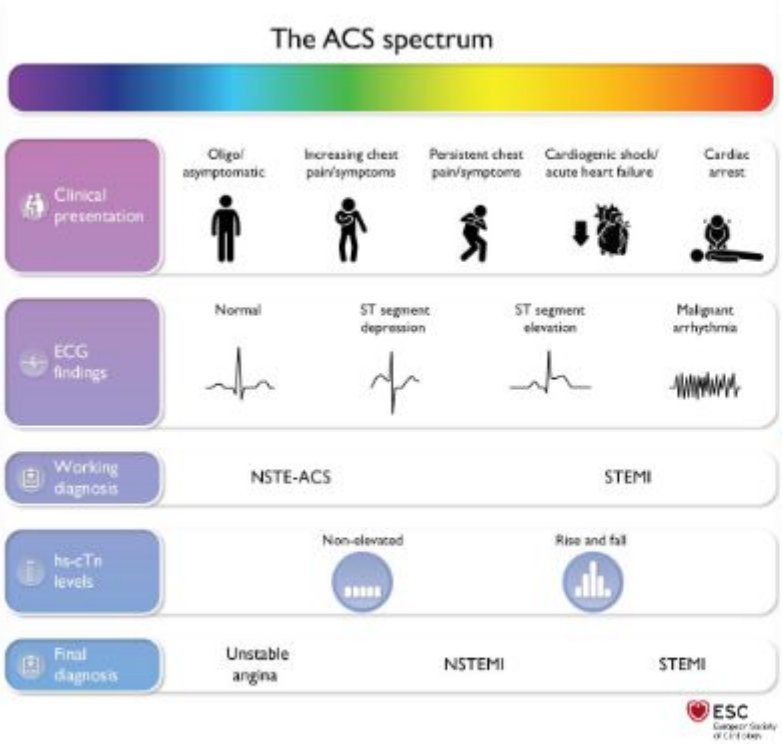
Di cosa si parla..

- Linee guida ESC
- Protocollo SCA-NSTE AULSS1 Dolomiti
- Alcuni dati

Linee guida ESC 2023 per SCA



JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY VOL. 72, NO. 18, 2018

EXPERT CONSENSUS DOCUMENT

Fourth Universal Definition of Myocardial Infarction (2018)

Aumento o diminuzione di **cTn con almeno un valore > 99° percentile** del limite superiore di riferimento

\+ uno dei seguenti criteri:

- Sintomi
- Elettrocardiogramma
- Onda Q patologica
- Imaging
- Angiografia o autopsia

Thygesen K. Et al. 2018

European Heart Journal (2016) 37, 267–315
doi:10.1093/eurheartj/ehv320

ESC GUIDELINES

2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

Task Force for the
in Patients Presenti
of the European So

A rapid rule-out and rule-in protocol at 0 h and 1 h is recommended if a high-sensitivity cardiac troponin test with a validated 0 h/1 h algorithm is available. Additional testing after 3–6 h is indicated if the first two troponin measurements are not conclusive and the clinical condition is still suggestive of ACS.	I	B

ESC European Society of Cardiology
European Heart Journal (2021) 42, 1289–1367
doi:10.1093/eurheartj/ehaa575

ESC GUIDELINES

2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

The ESC 0 h/1 h algorithm with blood sampling at 0 h and 1 h is recommended if an hs-cTn test with a validated 0 h/1 h algorithm is available.[30,33,35,36,39,68,69,75,76]	I	B

2023 ESC Guidelines for the management of acute coronary syndromes

Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC)

It is recommended to use an ESC algorithmic approach with serial hs-cTn measurements (0 h/1 h or 0 h/2 h) to rule in and rule out NSTEMI.[28–44]	I	B

CARDIOLOGY/ORIGINAL RESEARCH

Multicenter Evaluation of a 0-Hour/1-Hour Algorithm in the Diagnosis of Myocardial Infarction With High-Sensitivity Cardiac Troponin T

Christian M… …pi, MD;
James… …D;
Franck Versch… …Dipl Stat;

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY VOL. 72, NO. 6, 2018
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Prospective Validation of the 0/1-h Algorithm for Early Diagnosis of Myocardial Infarction

Raphael T… …Ojeda, PhD,[b]
Mahir Kar… …,[a]
Maria Rub…
Dominik E… …MD,[a]
Desiree W… …nica, MD,[g,h]
Nicolas Ge… …rg, MD,[b,c]

ORIGINAL INVESTIGATIONS

Outcome of Applying the ESC 0/1-hour Algorithm in Patients With Suspected Myocardial Infarction

ESC European Society of Cardiology
European Heart Journal: Acute Cardiovascular Care (2021) **10**, 279–286
doi:10.1177/2048872620935399

REVIEW

Performance of the European Society of Cardiology 0/1-hour algorithm in the diagnosis of myocardial infarction with high-sensitivity cardiac troponin: Systematic review and met…

Lucreci…

Circulation Reports
Circ Rep 2022; 4: 241–247
doi:10.1253/circrep.CR-22-0001

REVIEW

Performance of the 0-Hour/1-Hour Algorithm for Diagnosing Myocardial Infarction in Patients With Chest Pain in the Emergency Department

— A Systematic Review and Meta-Analysis —

-NPV per MI in Rule out ~99%
-PPV per MI in Rule in ~ 70-75%

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AVVERTENZE SPECIALI:

(i) Gli algoritmi dovrebbero essere utilizzati **solo insieme a tutte le informazioni cliniche disponibili**, inclusa la valutazione dettagliata delle caratteristiche del dolore toracico caratteristiche, dell'ECG e devono essere applicati solo dopo l'esclusione di STEMI o altre condizioni potenzialmente letali.

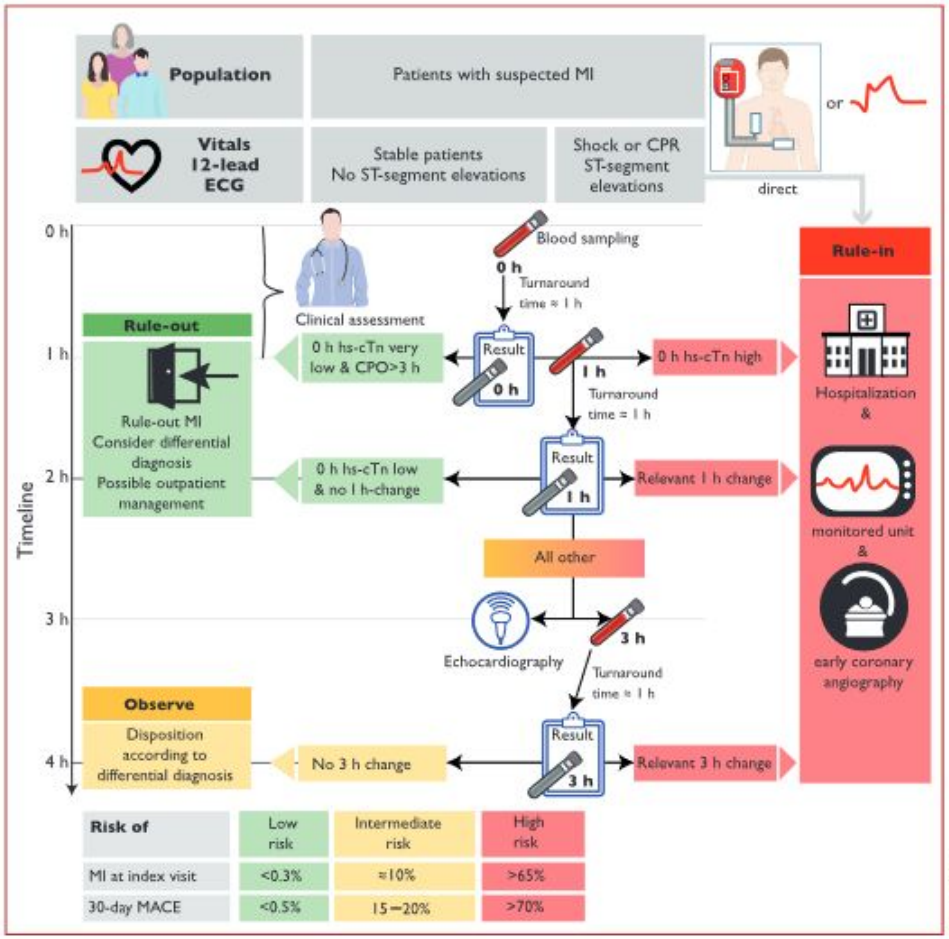
(ii) Gli algoritmi rapidi dovrebbero essere utilizzati solo nei pazienti che si presentano con sospetta SCA e **non deve essere applicato in modo non selezionato** (ovvero in pazienti con ictus o sepsi).

(iii) Algoritmi 0 h/1 h e 0 h/2 h (ESC) si applicano a tutti i pazienti indipendentemente dall'insorgenza del dolore toracico. L'approccio è molto sicuro (valore predittivo negativo [NPV] e sensibilità >99%), incluso nel sottogruppo di pazienti che si presentano molto precoce (ad es. <2 h). Tuttavia, a causa della dipendenza temporale di cTn rilascio e il numero moderato di pazienti che si sono **presentati <1 ora dopo insorgenza di dolore toracico** in studi precedenti, ottenendo un cTn aggiuntivo la concentrazione a 3 ore nei primi relatori è stata valutata per l'esclusione dovrebbe essere considerato.

(iv) Poiché aumenti tardivi della cTn sono stati descritti in circa l'1% dei pazienti, il test cTn dovrebbe essere effettuato anche se il sospetto clinico rimane elevato o se il paziente sviluppa dolore toracico ricorrente.

(v) **Tempo necessario alla decisione** = tempo del prelievo di sangue + tempo di risposta. L'uso degli algoritmi ESC 0 h/1 h è **indipendente dal turnaround locale tempo** (tempo dal prelievo di sangue ai risultati del sangue); 0 ore e 1 ora si riferisce al momento in cui viene prelevato il sangue. **Potrebbe essere necessario effettuare il secondo prelievo prima che i risultati del primo siano disponibili.**

(vi) Gli algoritmi ESC 0 h/1 h e 0 h/2 h sono specifici per ogni test e **possono essere utilizzati solo per i test validati.**



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- Cut-off validati specifici per dosaggio

3.3.4.1. European Society of Cardiology 0 h/1 h and 0 h/2 h algorithms

The ESC 0 h/1 h and 0 h/2 h algorithms are based on two underlying concepts: firstly, hs-cTn is a continuous variable and the probability of MI increases with increasing hs-cTn values.[28,30,31,34,35,73,82] Secondly, early absolute changes in the levels within 1 h or 2 h can be used as surrogates for absolute changes over 3 h or 6 h and provide incremental diagnostic value to the single cTn assessment at presentation.[27,28,30,31,34,35,73,82,97] The cut-off concentrations within the 0 h/1 h and 0 h/2 h algorithms are assay specific (Supplementary data online, *Table S4*).[27,28,30,31,34,35,73,82]

Laboratorio

POCT

Table S4 Assay specific cut-off levels in ng/L within the 0 h/1 h and 0 h/2 h algorithms

0 h/1 h algorithm	Very low	Low	No 1 hΔ	High	1 hΔ
hs-cTnT (Elecsys; Roche)	<5	<12	<3	≥52	≥5
hs-cTnI (Architect; Abbott)	<4	<5	<2	≥64	≥6
hs-cTnI (Centaur; Siemens)	<3	<6	<3	≥120	≥12
hs-cTnI (Access; Beckman Coulter)	<4	<5	<4	≥50	≥15
hs-cTnI (Clarity; Singulex)	<1	<2	<1	≥30	≥6
hs-cTnI (Vitros; Ortho Clinical Diagnostics)	<1	<2	<1	≥40	≥4
hs-cTnI (Pathfast; LSI Medience)	<3	<4	<3	≥90	≥20
hs-cTnI (TriageTrue; Quidel)	<4	<5	<3	≥60	≥8
hs-cTnI (Dimension EXL; Siemens)	<9	<9	<5	≥160	≥100
0 h/2 h algorithm	**Very low**	**Low**	**No 2 hΔ**	**High**	**2 hΔ**
hs-cTnT (Elecsys; Roche)	<5	<14	<4	≥52	≥10
hs-cTnI (Architect; Abbott)	<4	<6	<2	≥64	≥15
hs-cTnI (Centaur; Siemens)	<3	<8	<7	≥120	≥20
hs-cTnI (Access; Beckman Coulter)	<4	<5	<5	≥50	≥20
hs-cTnI (Clarity; Singulex)	<1	TBD	TBD	≥30	TBD
hs-cTnI (Vitros; Ortho Clinical Diagnostics)	<1	TBD	TBD	≥40	TBD
hs-cTnI (Pathfast; LSI Medience)	<3	TBD	TBD	≥90	TBD
hs-cTnI (TriageTrue; Quidel)	<4	TBD	TBD	≥60	TBD

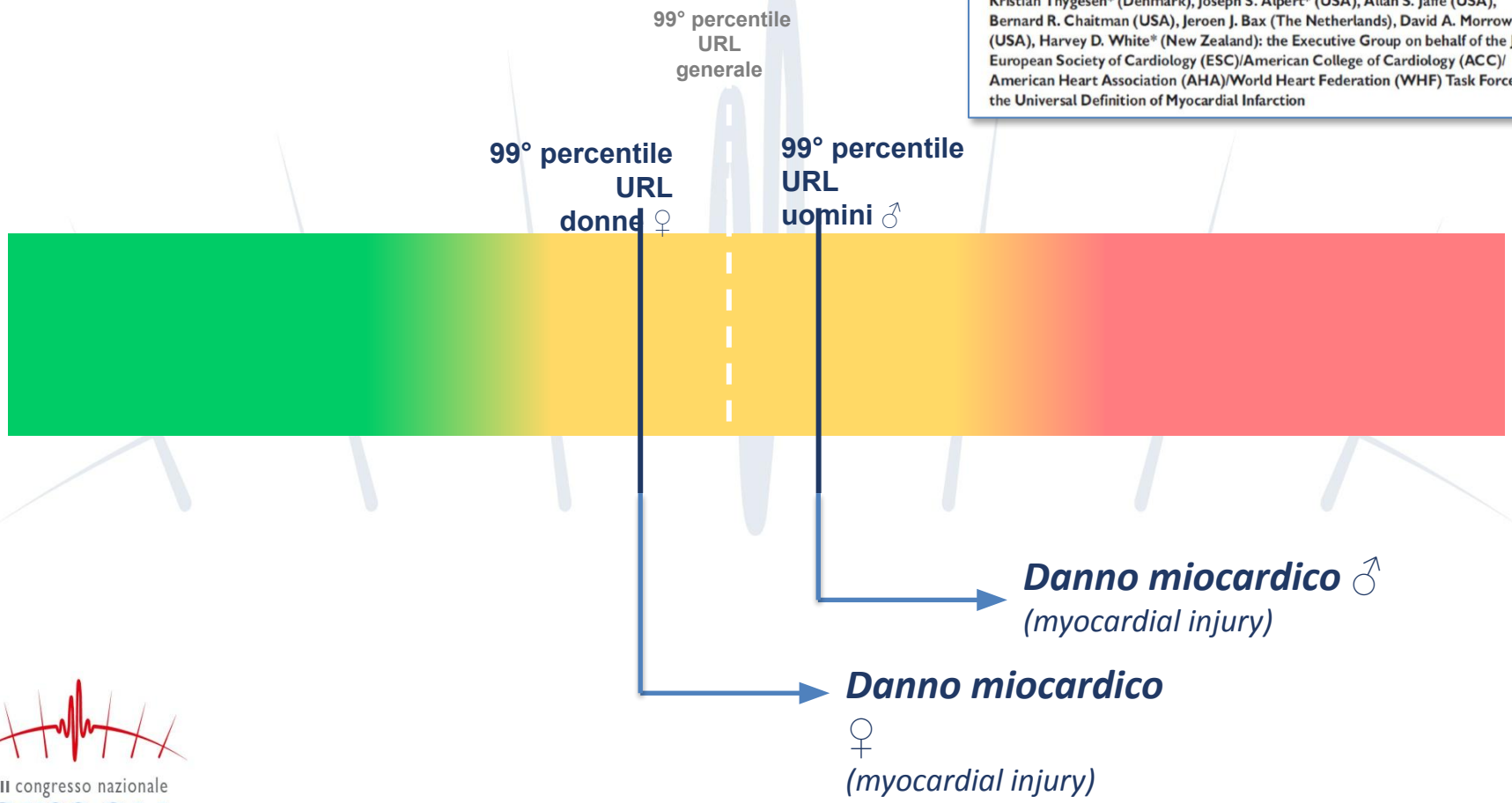
The cut-offs apply irrespective of age, sex, and renal function. Optimized cut-offs for patients above 75 years of age and patients with renal dysfunction have been evaluated, but not consistently shown to provide better balance between safety and efficacy as compared with these universal cut-offs.[30,31] The algorithms for additional assays are in development: hs-cTn T on Elecsys (Roche), hs-cTn I on Architect (Abbott), hs-cTn I on Centaur (Siemens), hs-cTn I on Access (Beckman Coulter), hs-cTn I on Clarity (Singulex), hs-cTn I on Vitros (Clinical Diagnostics), hs-cTn I on Pathfast (LSI Medience), and hs-cTn I on TriageTrue (Quidel).
hs-cTn, high-sensitivity cardiac troponin; TBD, to be determined.[30,31,67–88]

- hs-cTn: una variabile continua

ESC European Society of Cardiology
European Heart Journal (2018) 00, 1–33
doi:10.1093/eurheartj/ehy462
EXPERT CONSENSUS DOCUMENT

Fourth universal definition of myocardial infarction (2018)

Kristian Thygesen* (Denmark), Joseph S. Alpert* (USA), Allan S. Jaffe (USA), Bernard R. Chaitman (USA), Jeroen J. Bax (The Netherlands), David A. Morrow (USA), Harvey D. White* (New Zealand): the Executive Group on behalf of the Joint European Society of Cardiology (ESC)/American College of Cardiology (ACC)/ American Heart Association (AHA)/World Heart Federation (WHF) Task Force for the Universal Definition of Myocardial Infarction



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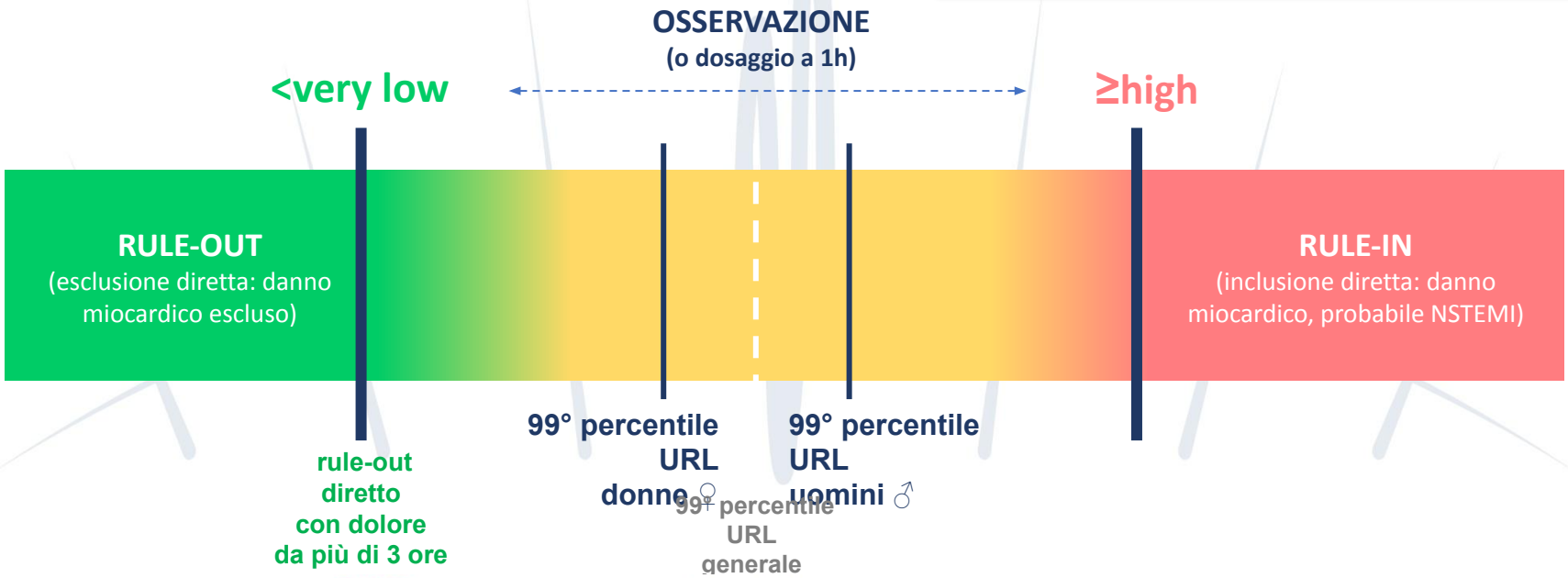
- hs-cTn: una variabile continua
- triage a singolo dosaggio (0h)

ESC European Society of Cardiology
European Heart Journal (2023) 44, 3720–3826
https://doi.org/10.1093/eurheartj/ehad191
ESC GUIDELINES

2023 ESC Guidelines for the management of acute coronary syndromes

Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC)



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hs-cTnI (Dimension EXL; Siemens)	<9	<9	<5	≥160	≥100

The cut-offs apply irrespective of age, sex, and renal function.

- hs-cTn: una variabile continua
- triage a singolo dosaggio
- algoritmo 0/1-h

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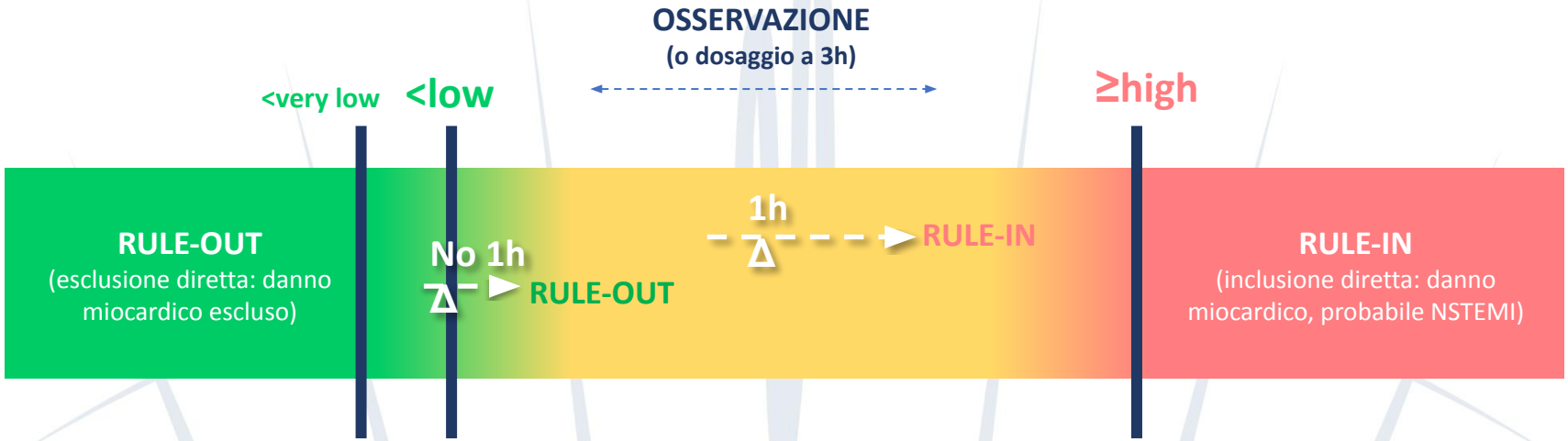

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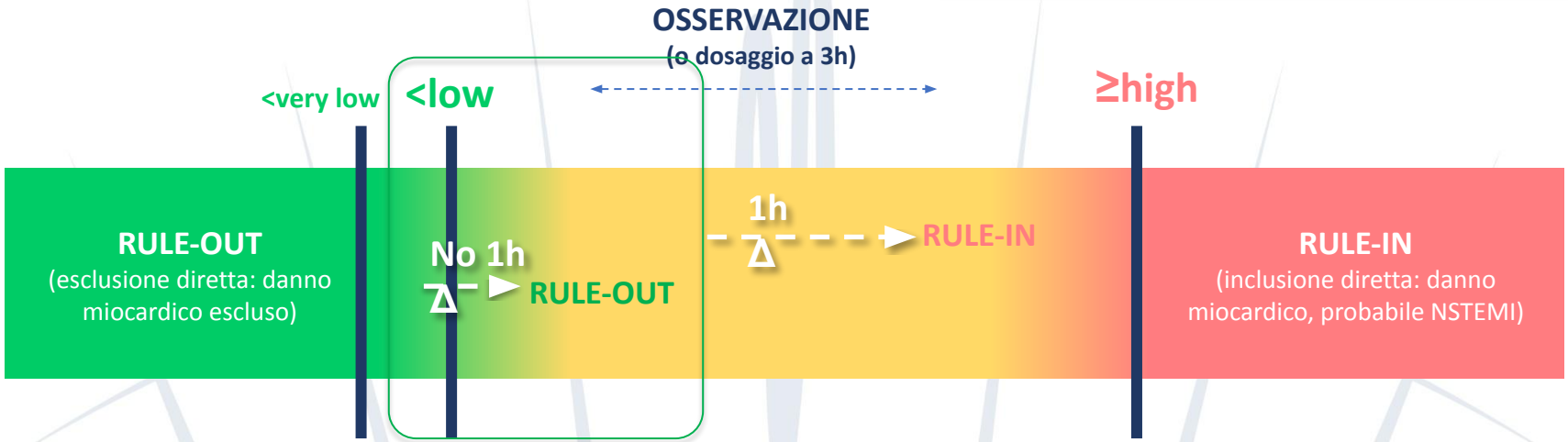

Condizioni di RULE-OUT a 1h:

- hs-cTn 0h al di sotto di soglia **low**
- **e variazione hs-cTn 1h** minore del valore **No 1h Δ**

Table S4 Assay specific cut-off levels in ng/L within the 0 h/1 h and 0 h/2 h algorithms

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- hs-cTn: una variabile continua
- triage a singolo dosaggio
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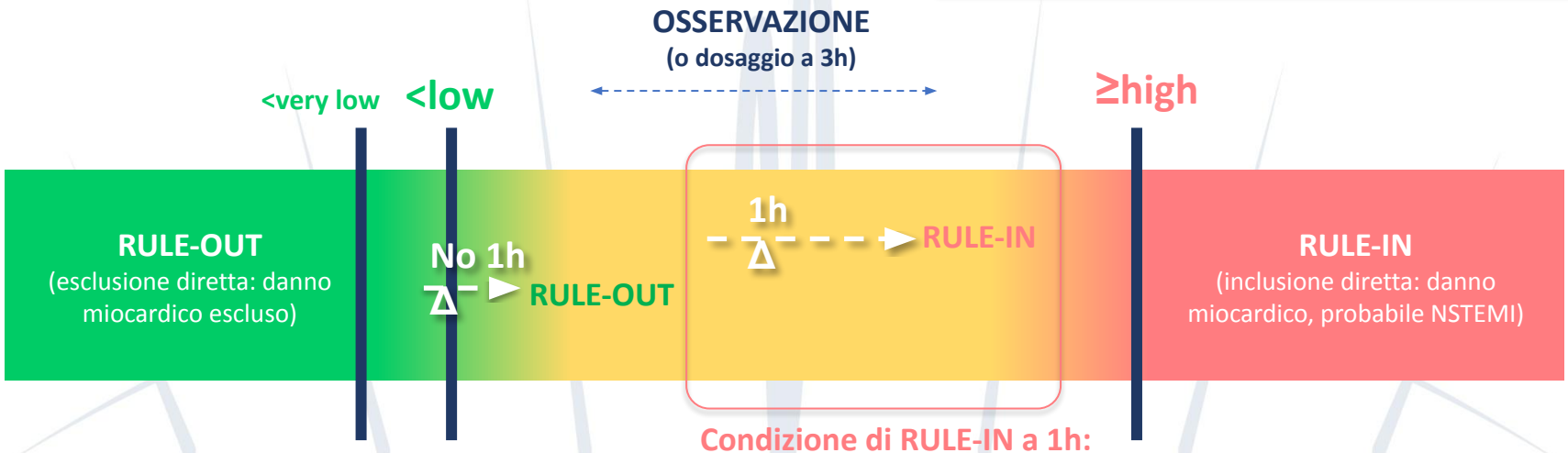

Condizione di RULE-IN a 1h:

- **variazione hs-cTn** 1h maggiore del valore **1 h Δ**

NB: anche se entrambi i valori sono al di sotto del 99° percentile

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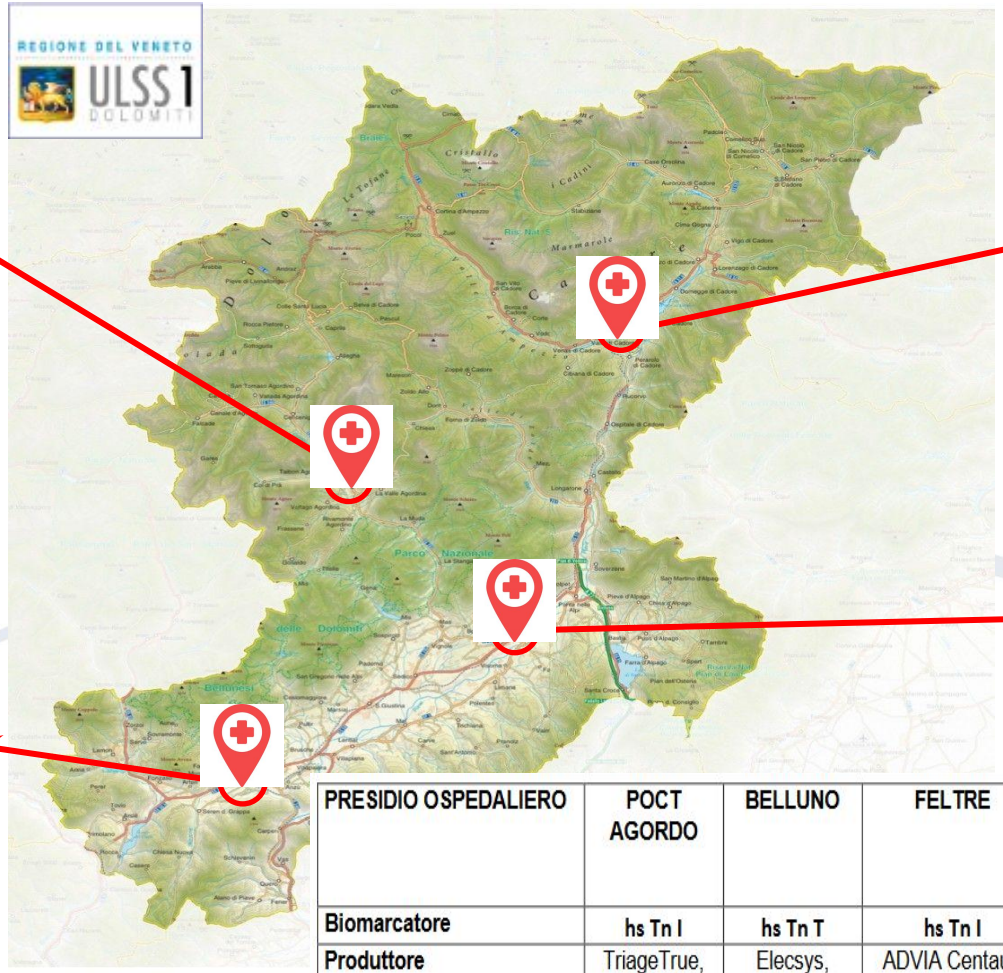
Ospedale di Agordo

Ospedale di Pieve di Cadore



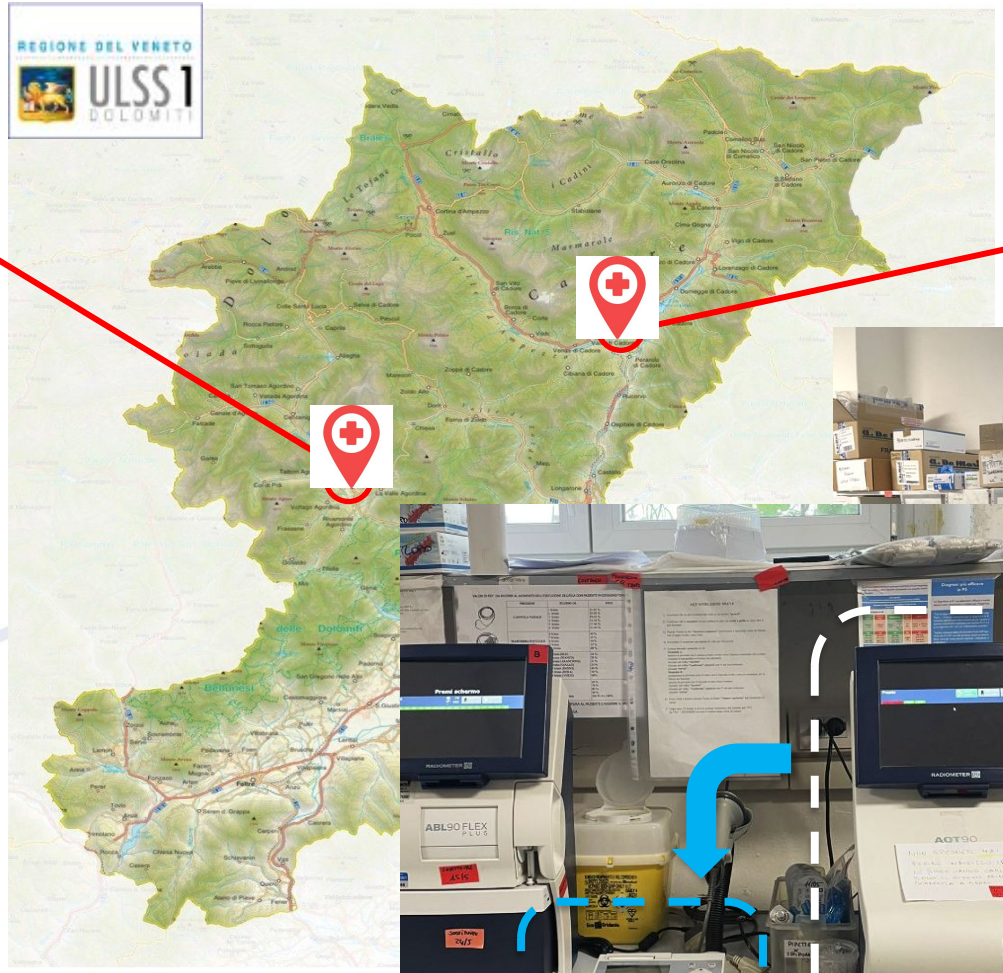
Ospedale di Belluno

Ospedale di Feltre

PRESIDIO OSPEDALIERO	POCT AGORDO	BELLUNO	FELTRE	PIEVE DI CADORE (8.00 – 16.00)	POCT PIEVE DI CADORE (16.00 – 8.00)
Biomarcatore	**hs Tn I**	**hs Tn T**	**hs Tn I**	**hs Tn T**	**hs Tn I**
Produttore	TriageTrue, Quidel C.	Elecsys, Roche	ADVIA Centaur, Siemens	Elecsys, Roche	TriageTrue, Quidel C.
"Rule-out" diretto 0h	< 3 ng/L	< 12 ng/L	< 6 ng/L	< 12 ng/L	< 3 ng/L
"Rule-out" con delta 0-1h	< 3 ng/L	< 3 ng/L	< 3 ng/L	< 3 ng/L	< 3 ng/L
99° percentile M 0h	25,7 ng/L	15,5 ng/L	58 ng/L	15,5 ng/L	25,7 ng/L
99° percentile F 0h	14,4 ng/L	9 ng/L	39,6 ng/l	9 ng/L	14,4 ng/L
"Rule-in" diretto 0h	≥ 60 ng/L	≥ 52 ng/L	≥ 120 ng/L	≥ 52 ng/L	≥ 60 ng/L
"Rule-in" con delta 0-1h	≥ 8 ng/L	≥ 5 ng/L	≥ 12 ng/L	≥ 5 ng/L	≥ 8 ng/L

Ospedale di Agordo

Ospedale di Pieve di Cadore



"minilab" di Agordo

Protocollo SCA-NSTE AULSS1 Dolomiti

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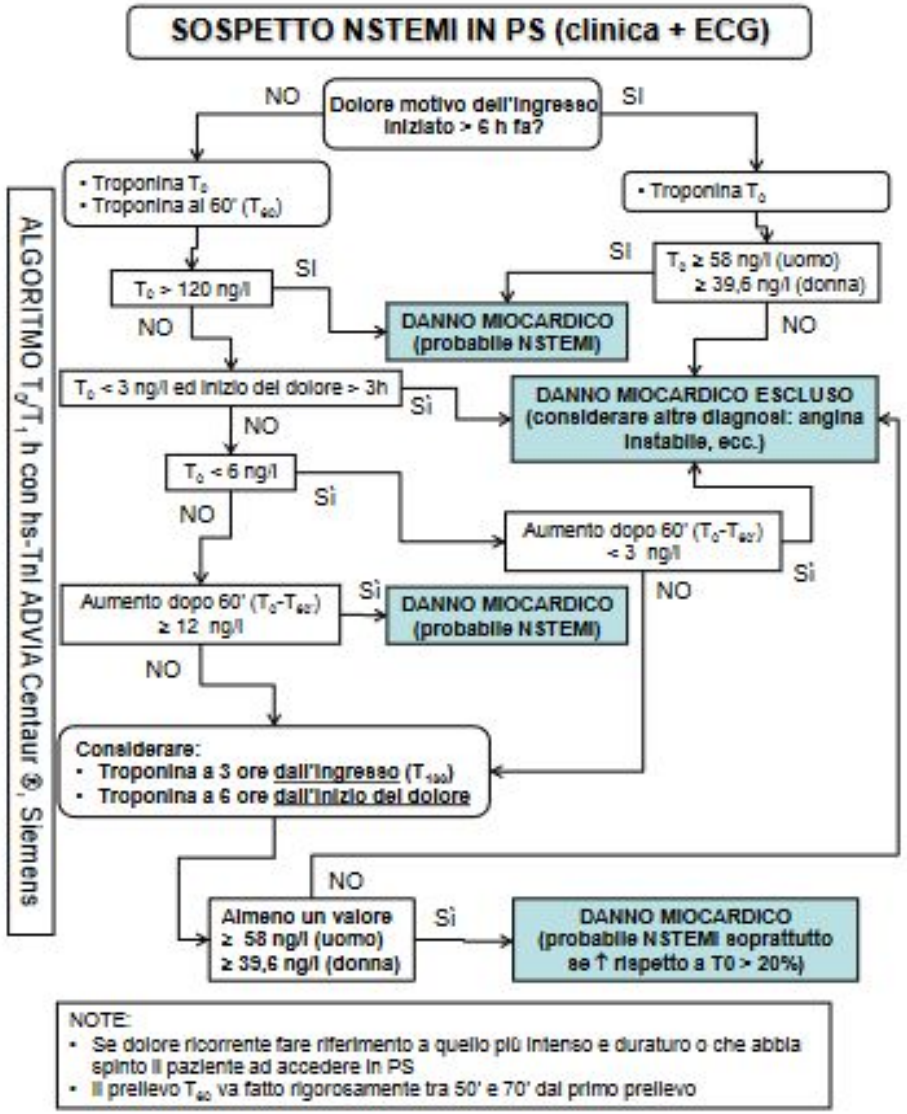
Feltre

hs-cTnI Centaur (Siemens)

REGIONE DEL VENETO ULSS 1 DOLOMITI	SISTEMA DI GESTIONE PER LA QUALITÀ Allegato	ALL 2
	Azienda ULSS 1 Dolomiti	Rev. 00 del 30/11/2022
	SOSPETTO NSTEMI hs-TnI Centaur, Siemens Rif. PGA 33 Gestione del paziente con SCA-NSTE	Pag. 1 di 1



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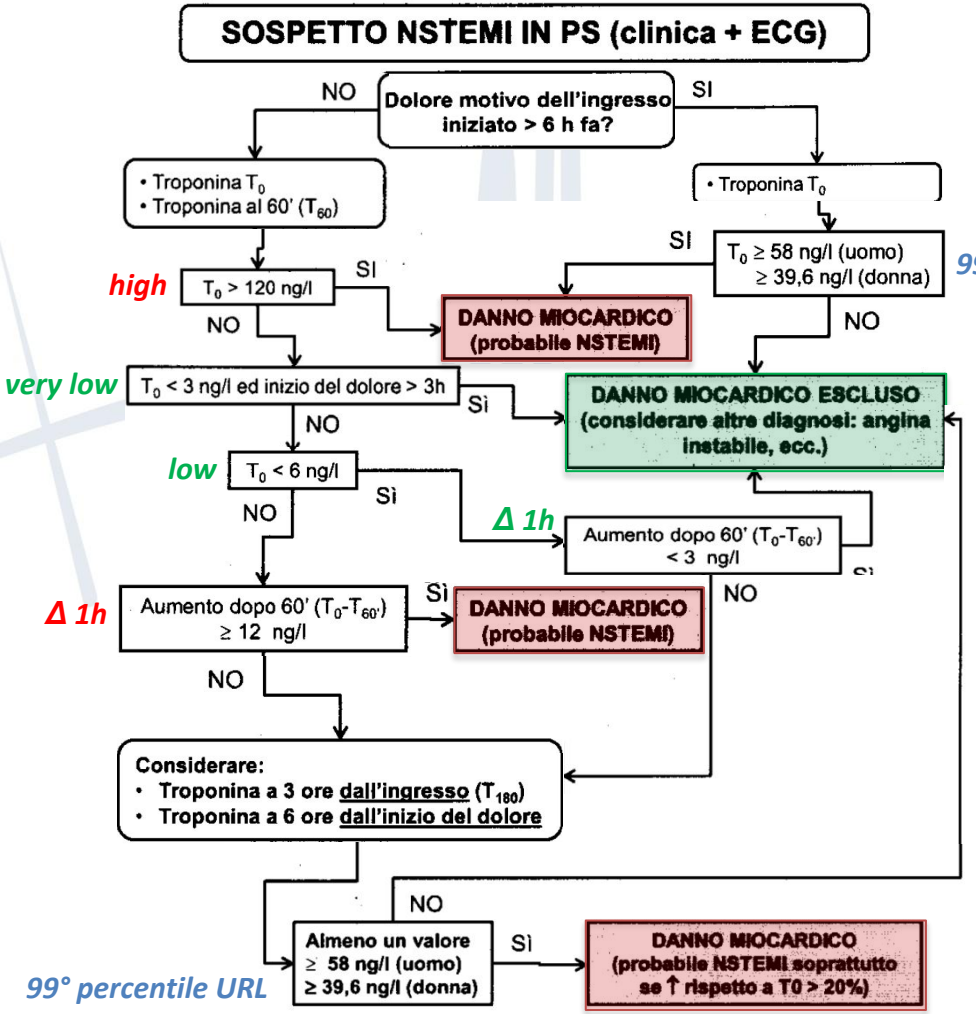
NOTE:
- Se dolore ricorrente fare riferimento a quello più intenso e duraturo o che abbia spinto il paziente ad accedere in PS
- Il prelievo T_{60} va fatto rigorosamente tra 50' e 70' dal primo prelievo

Feltre

hs-cTnI Centaur (Siemens)



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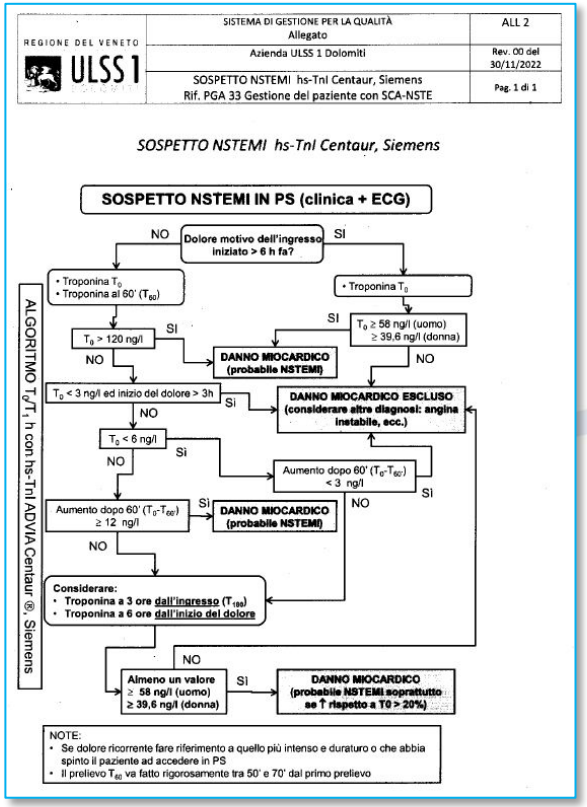
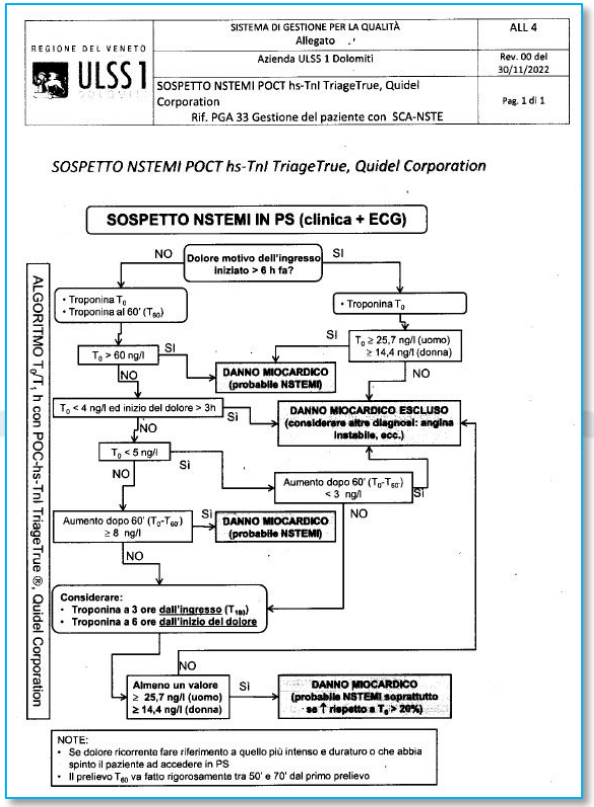
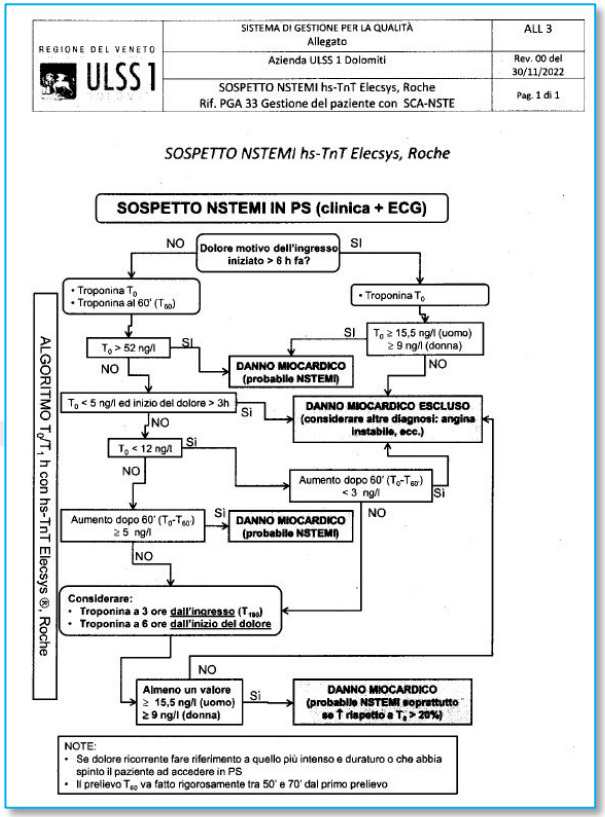
Protocolli analoghi, cutoff differenti







Feltre

hs-cTnI Centaur (Siemens)

Pieve di Cadore Agordo

hs-cTnI TriageTrue (QuidelOrtho)

Belluno

hs-cTnT Elecsys (Roche)

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La realtà del Pronto Soccorso di Feltre

Camera calda

Triage

Post triage

Ambulatori per valutazione codici maggiori

Open space

Feltre

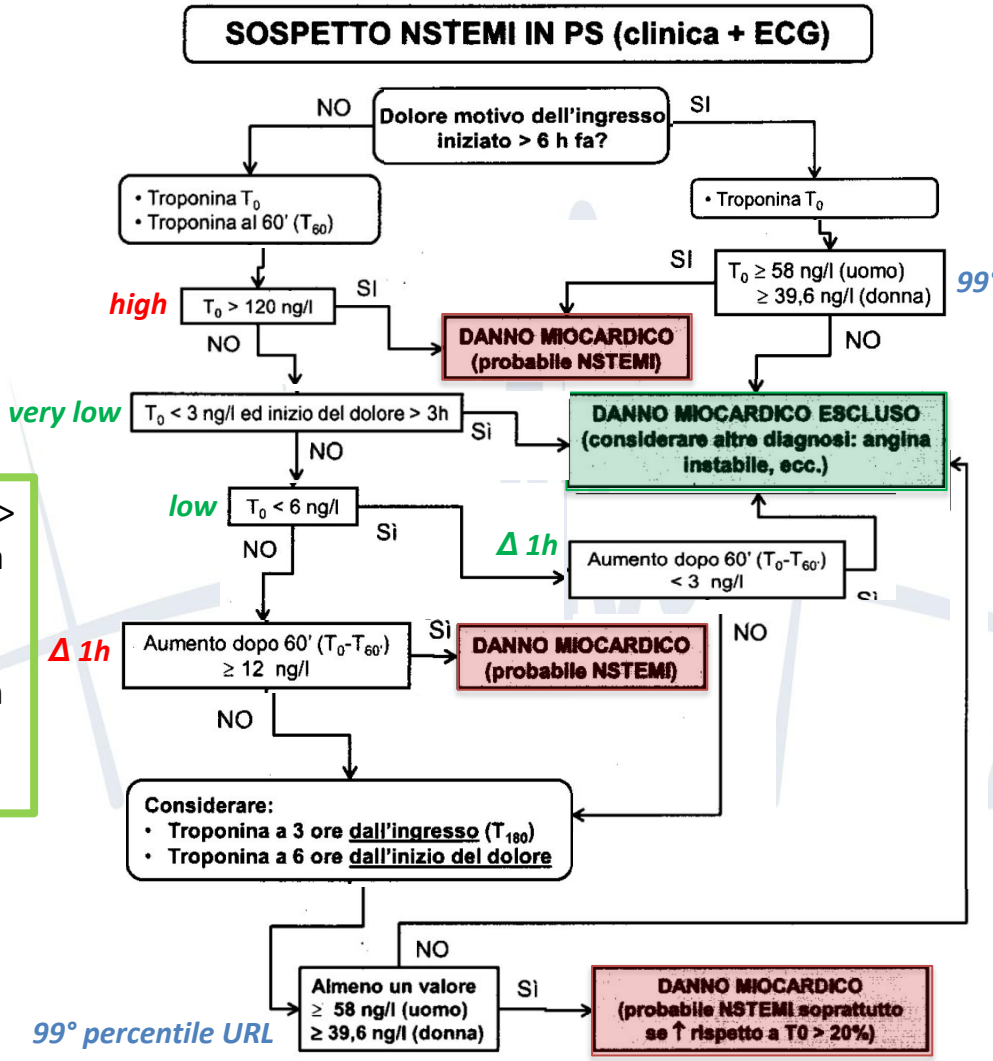
Alcuni dati

hs-cTnI Centaur (Siemens)

- Accessi consecutivi dal 6.02.24 al 7.03.24 per dolore toracico in PS di Feltre
- 150 pazienti
- Età media 58 anni
- Uomini 82, donne 68
- Pazienti con dolore da >6 h 86 (57%)
- Applicato algoritmo 0-1 h 59 (39%)

Feltre

hs-cTnI Centaur (Siemens)



Rule out: 129 pz (86%) > 2 pz UA coronarografia positiva
Di cui 43 con algoritmo 0-1h, 86 per dolore >6h con TnI<99° percentile
NPV 98.4%

Rule in: 4 pz (3 STEMI) (2,5%)
PPV 100%

Observe: 17 pz (11.3%) > 3 pz UA coronarografia positiva

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Conclusioni

- L'algoritmo ESC 0/1-h è applicabile sia con metodi POCT che con metodi di laboratorio (con la dovuta organizzazione) a patto che il triage venga eseguito con lo stesso metodo
- Le varie **hs-TnI** disponibili (POCT/Lab) e **hs-TnT** (Lab) possono essere utilizzate sempre secondo i rispettivi cutoff
- È raccomandato basare la diagnosi e la stratificazione iniziale del rischio di SCA a breve termine su una combinazione di storia clinica, sintomi, segni vitali, altri reperti clinici e ECG e hs-cTn

Grazie per l’attenzione

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