14TH ADRIATIC CONGRESS OF PHARMACOECONOMICS & OUTCOMES RESEARCH

Focus on Central & Eastern Europe · Brijuni, Croatia · April 23–25, 2026

Cardiovascular Hospitalisation Costs and Cost-Effectiveness of Transthyretin Stabilizers in the Slovak Healthcare System

A Markov Model Analysis

Robert Babela, Peter Polak

Slovak Medical University & Project HealthCare — Bratislava, Slovakia

Agenda

01

Heart failure & ATTR-CM (Transthyretin Amyloid Cardiomyopathy)

The economic landscape

02

Clinical evidence

Tafamidis (ATTR-ACT) & acoramidis (ATTRibute-CM)

03

Slovak Markov model

Methods, inputs, results

04

Discussion & policy implications

Value, caveats, the registry call

Heart failure: a growing global economic burden

Inpatient care dominates direct costs

>64 M

people with heart failure worldwide

ESC HF Review 2025

75–80%

of HF direct costs are inpatient

HFSA economic burden paper

0.5–1.3

HF admissions per patient per year in Europe

ESC HF Review 2025

European hospital budgets absorb the bulk of HF cost. Rare cardiomyopathies with high readmission intensity — such as ATTR-CM — amplify this pattern.

Refs: Darbà J, Ascanio M, Rodríguez A, et al. Economic burden of heart failure in Europe — SLR. ESC Heart Fail 2025;12:4055–68. · HFSA writing group, economic burden of heart failure (USA).

ATTR-CM: a progressive, life-limiting cardiomyopathy

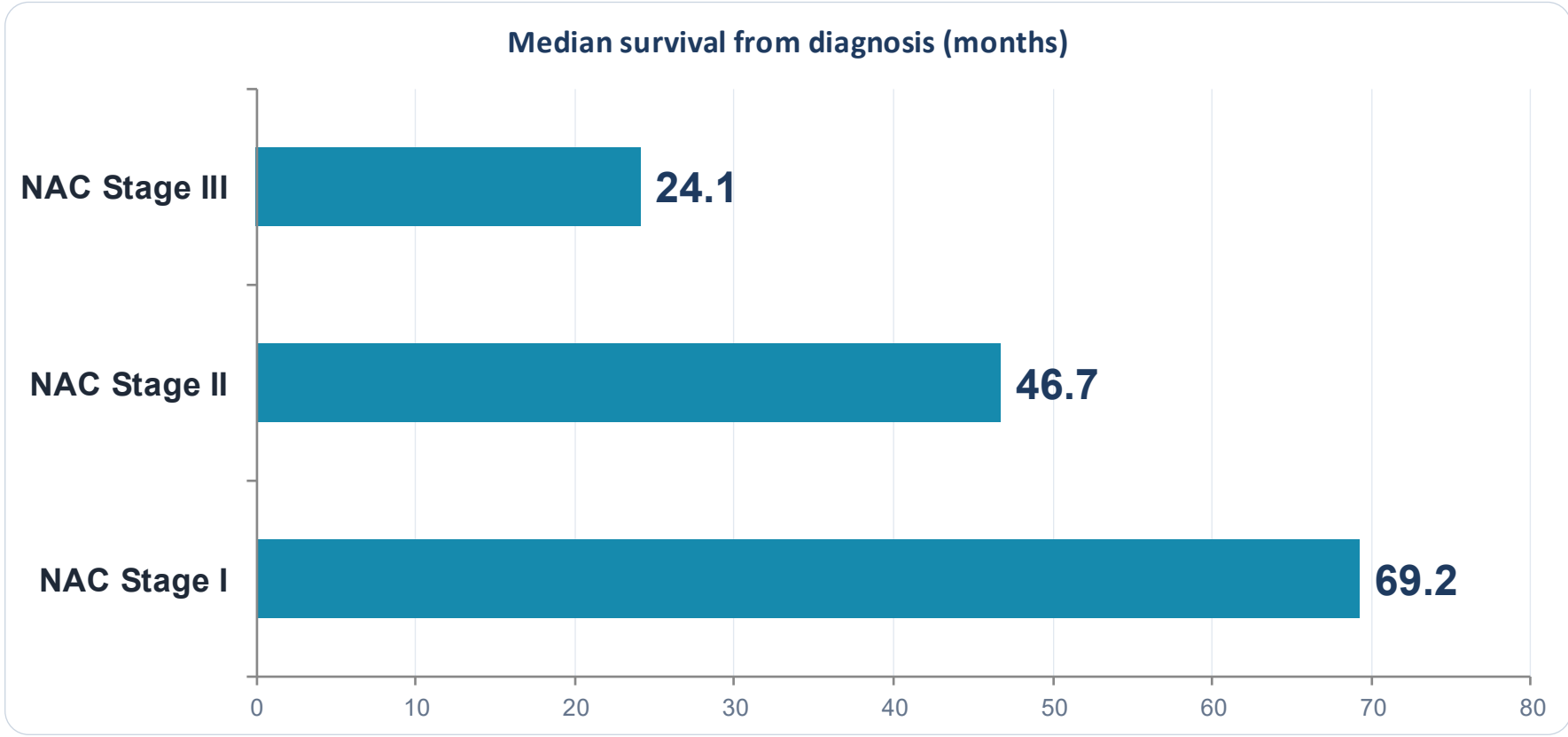
Stage-dependent survival — hospitalisations dominate clinical course

Clinical signature

Heart-failure symptoms, recurrent CV hospitalisations, premature death. NAC staging (Gillmore et al. 2018) stratifies prognosis from diagnosis.

Genotype matters

Median survival 69 mo (non-V122I hereditary), 57 mo (wild-type), 31 mo (V122I) — Lane et al. 2019.



Refs: Gillmore JD, et al. NAC staging, Eur Heart J 2018;39:2799–806. · Lane T, et al. Circulation 2019;140:16–26.

Why ATTR-CM is an economic outlier

Hospitalisations are the dominant direct-cost driver

87 – 93 %

of direct medical costs in ATTR-CM are generated by cardiovascular-related hospitalisations

Delgado D et al. | Gonzalez-Lopez et al.

Compared with general heart failure (≈75–80% inpatient share), ATTR-CM concentrates an even larger slice of spend into hospital walls.

Consequences for the payer

- Any intervention that reduces admissions has an outsized economic footprint.
- Cost savings are event-driven, not time-driven — they accrue with each avoided admission.
- DRG unit cost becomes the single most influential cost parameter.

Refs: Delgado D, et al. Epidemiology of ATTR amyloidosis, SLR. · HFSA economic burden paper (HF inpatient share).

International evidence on ATTR-CM resource use

Higher intensity vs. matched HF cohorts across health systems

NORDIC 4-COUNTRY

Denmark · Finland · Norway · Sweden (2008–2018, n=1,831)

Hospitalisations / yr

1.9 vs 1.4

ATTR-CM vs matched HF

Hospitalised days / yr

9.7 vs 7.2

Specialist visits / yr

8.7 vs 4.7

SWEDEN (NYHA)

Cost by severity, healthcare resource use study

Mean cost / patient / yr

€21,200

across NYHA II–IV

Diagnostic delay

3.5 years

prior to ATTR-CM dx

Principal driver

Inpatient

vs other HF types

USA MEDICARE

HF admissions with vs without ATTR-CM

1-yr total cost / pt

$60,373 vs $50,247

HF + ATTR-CM vs HF alone

HF readmission (1 yr)

36.8% vs 28.2%

adj HR 1.28 (1.01–1.61)

Outpatient spend

$20,866 vs $16,358

primary cost driver

Refs: Lauppe R, Hansen JL, Fornwall A, et al. Healthcare resource use of ATTR-CM — 4 Nordic countries. ESC Heart Fail. · Eldhagen P, et al. ESC Heart Fail 2023;10:1871–82 (Sweden, NYHA cost). · Shoji S, Ikeaba U, Fonarow GC, et al. Clinical outcomes & costs in HF + ATTR-CM — GWTG-HF. J Card Fail 2025. doi:10.1016/j.cardfail.2025.10.007.

The diagnostic gap is an economic inflection point

Delayed / missed diagnosis drives avoidable admissions

3.5 years

mean diagnostic delay before ATTR-CM diagnosis (Sweden)

17 visits

median hospital contacts in the 3 years before diagnosis (English analysis, n=524)

SPAIN — PROBABILISTIC MARKOV MODEL

Correct vs. missed ATTR-CM diagnosis

Correct diagnosis generates life-years gained and reduces CV hospitalisations for the Spanish NHS.

≈ €2,900

per patient saved at 15-year horizon vs. missed diagnosis

Diagnostic pathways — not just therapy — are a legitimate target for health-economic intervention.

Refs: Spanish probabilistic Markov model on correct vs. missed ATTR-CM diagnosis. Expert Rev Pharmacoecon Outcomes Res 2021;21:1127–33. · Lane T, et al. Circulation 2019;140:16–26 (England — pre-diagnosis hospital contacts).

Research question and objectives

"Can the cardiovascular-hospitalisation benefit observed in ATTR-ACT and ATTRibute-CM translate into measurable economic value within the Slovak public-payer setting?"

01

Derive Slovakia-specific per-patient hospitalisation cost offsets for both stabilizers

02

Compute ICERs (€/QALY) from a hospitalisation-only perspective

03

Extend projections to a 6.5-year horizon anchored in NAC staging evidence

04

Identify data gaps that a national ATTR-CM registry should close

Therapeutic breakthrough: two transthyretin stabilizers

Reduced CV morbidity and mortality in pivotal phase-III trials

ATTR-ACT (tafamidis)

CV hosp. rate (events / pt-yr)

0.48 vs 0.70

30-month all-cause mortality

29.5% vs 42.9%

Endpoint

All-cause mortality + CV hospitalisations over 12 mo

Maurer MS, et al. NEJM 2018;379:1007–16.

ATTRibute-CM (acoramidis)

CV hosp. rate (events / pt-yr)

0.22 vs 0.45

30-month all-cause mortality

19.3% vs 25.7%

Endpoint

Hierarchical composite; event curves separated by month 3

Gillmore JD, et al. NEJM 2024;390:132–42. · Judge DP, et al. JACC 2025.

Both trials demonstrate that stabilising TTR translates into fewer CV hospitalisations — the key lever we model for Slovakia.

Refs: Maurer MS, et al. NEJM 2018;379:1007–16 (ATTR-ACT). · Gillmore JD, et al. NEJM 2024;390:132–42 (ATTRibute-CM). · Judge DP, et al. JACC 2025;85:1003–14.

Slovak health-system context

How HTA and reimbursement frame this analysis

SK-DRG

SK-DRG reimbursement

Diagnosis-Related Group framework anchors unit cost per CV/HF admission in Slovakia.

NIHO

National Institute for Value and Technologies in Healthcare (NIHO)

Institutional framework for HTA appraisal and value-based reimbursement.

ZHL175

Public HTA appraisal — Beyonttra (acoramidis), ZHL175

Published dossier provides the reference unit-cost parameter used in this model.

Gap

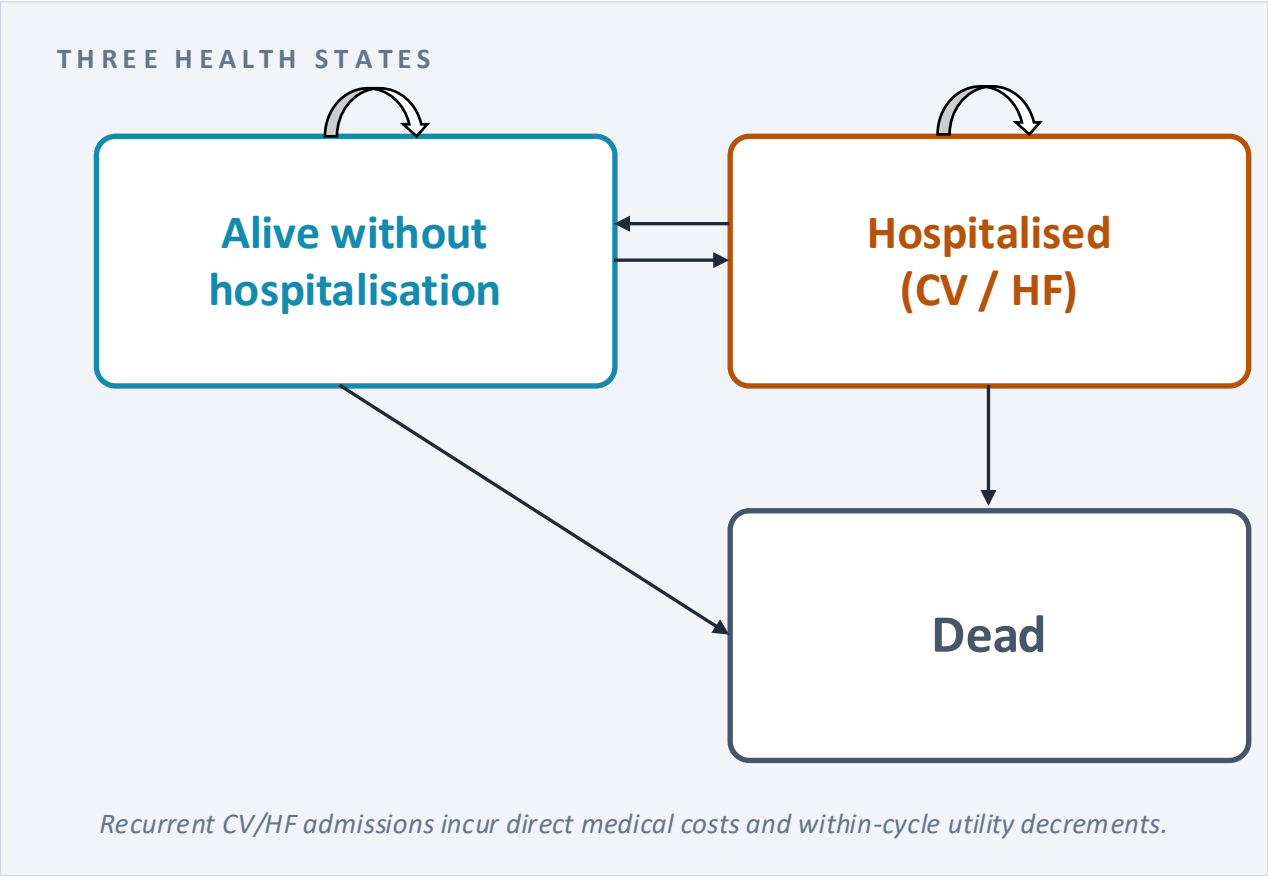
No national ATTR-CM registry

Absence of Slovak-specific real-world data constrains external validation of any economic model.

Refs: Slovak HTA appraisal — NIHO, Beyonttra (acoramidis), ZHL175 dossier. · MoH SR Decree No. 422/2011 (discount rate).

Methods — Markov model structure

Cohort-based state-transition model; monthly cycles; half-cycle correction



Recurrent CV/HF admissions incur direct medical costs and within-cycle utility decrements.

PERSPECTIVE

Slovak public-payer and hospital · Direct CV / HF hospitalisation costs only.

TIME HORIZONS

12 months (base case) · 6.5 years (scenario — NAC-staging mean survival).

RATE ↔ PROBABILITY

Constant-hazard embedding (ISPOR-SMDM good-practice).

$$p = 1 - e^{(-\lambda \Delta t)}$$

$$\lambda = -\ln(1 - P) / T$$

VALIDATION

Matrix back-transforms reproduce trial event rates exactly (placebo 0.44 → model 0.443; acoramidis 0.25 → 0.252).

Refs: Siebert U, et al. ISPOR-SMDM state-transition guidance, Value Health 2012;15:812–20. · Sonnenberg FA, Beck JR. Med Decis Making 1993;13:322–38. · MoH SR Decree 422/2011 (5% discount).

Methods — Input parameters

Clinical, economic and utility values (Table 1, Lekársky Obzor 2026)

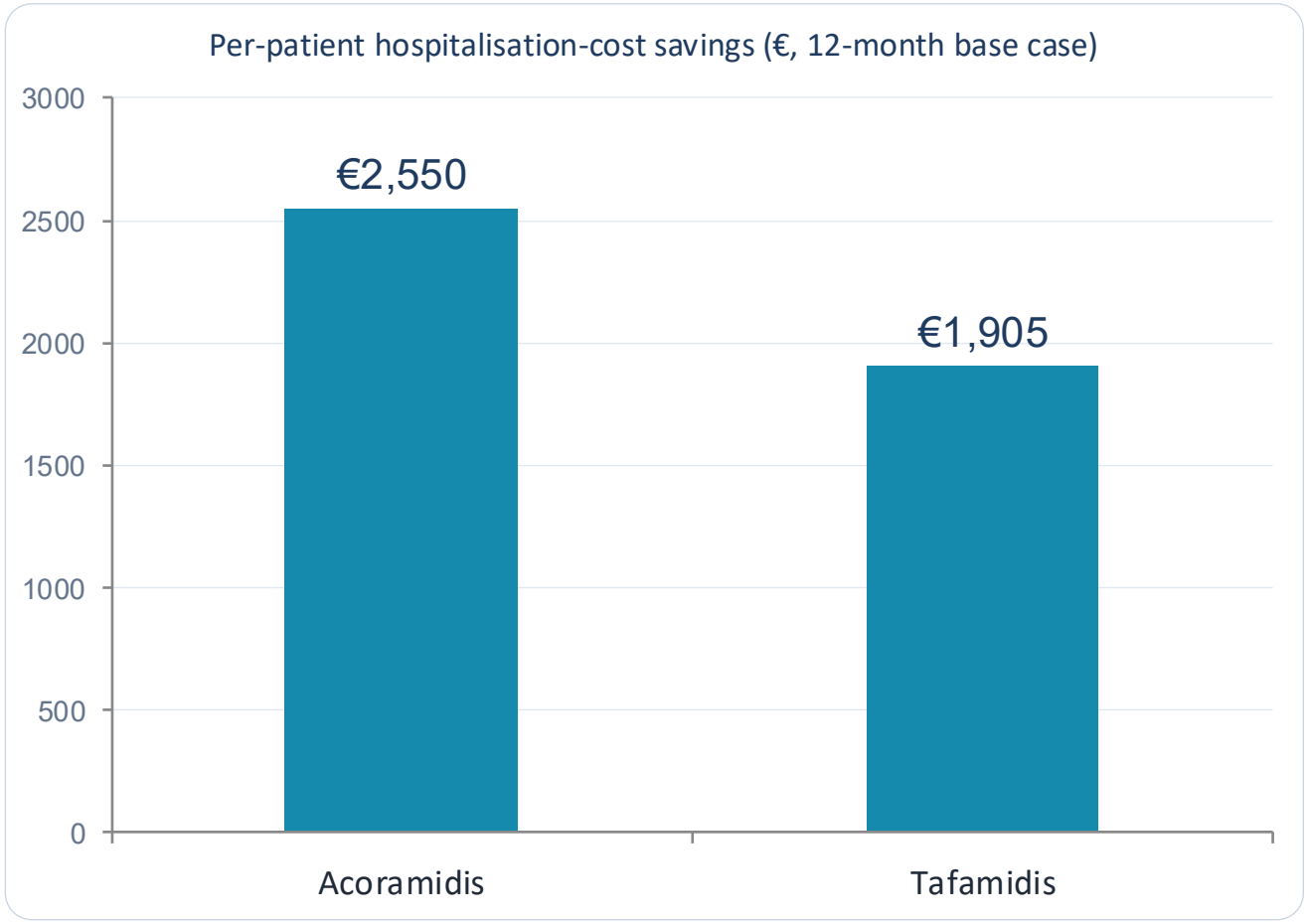
Parameter	Value	Cycle / unit	Source
P(hospitalised / yr) — standard (ATTRibute-CM arm)	**0.443**	*year*	*ATTRibute-CM (8)*
P(hospitalised / yr) — acoramidis	**0.252**	*year*	*ATTRibute-CM (8)*
P(hospitalised / yr) — standard (ATTR-ACT arm)	**0.503**	*year*	*ATTR-ACT (7)*
P(hospitalised / yr) — tafamidis	**0.381**	*year*	*ATTR-ACT (7)*
P(discharge alive | hospitalised)	**0.876**	*year*	*Trial-derived*
Utility — alive, no hospitalisation	**0.80**	*month*	*Eldhagen 2023 (15)*
Utility — hospitalised	**0.56**	*month*	*Eldhagen 2023 (15)*
Unit cost — CV / HF admission (Slovakia)	**€3,462.94**	*per admission*	*NIHO, ZHL175*
Mean survival — extended scenario	**6.5 yr**	—	*NAC staging (1)*
Discount rate — costs & effects	**5%**	*per year*	*MoH SR 422/2011*

Base-case event rates are identical to those reported in the pivotal trials (ATTRibute-CM: 0.22 vs 0.45 events/pt-yr; ATTR-ACT: 0.48 vs 0.70 events/pt-yr).

Refs: Babela et al. Lek Obz 2026;75(2), Table 1. · NIHO appraisal ZHL175 (Beyonttra). · Eldhagen P, et al. ESC Heart Fail 2023;10:1871–82.

Results — Base case (12 months)

Per-patient hospitalisation-cost savings vs. standard care



ACORAMIDIS

– €2,550

saved per patient in hospitalisation costs

TAFAMIDIS

– €1,905

saved per patient in hospitalisation costs

Refs: Babela et al. Lek Obz 2026;75(2), Results section — 12-month base case.

Results — Extended 6.5-year horizon and cost-effectiveness

Dominant acoramidis profile; highly favourable tafamidis ICER

	Treatment	Standard	Δ (Treatment – Std)	ICER (€ / QALY)
ACORAMIDIS	€9,719	€21,916	– €12,196	– €15,720.22
	4.82 QALY	4.04 QALY	+ 0.78 QALY	
TAFAMIDIS	€16,371	€15,933	+ €437	€450.23
	3.45 QALY	2.48 QALY	+ 0.97 QALY	
	Highly favourable — €/QALY well below Slovak willingness-to-pay thresholds			

Both agents fall south-east of the origin: QALY-positive. Acoramidis is also cost-negative (cost-saving, dominant).

Refs: Babela et al. Lek Obz 2026;75(2), Tables 6 & 7; 6.5-yr scenario results.

Conclusions — population impact and caveats

POPULATION-LEVEL IMPLICATIONS

≈ €1.2 million

cumulative hospitalisation-cost savings projected for a 100-patient acoramidis cohort over 6.5 years.

+ 0.78 QALY / patient (acoramidis)

≈ 9.4 months of perfect health equivalent, ≈ 19.3% improvement in quality-adjusted life expectancy over 6.5 years vs. standard therapy.

IMPORTANT CAVEATS

Hospitalisation-only perspective

Drug acquisition costs, outpatient care, and rehabilitation are outside this scope. A full cost-utility analysis requires acquisition pricing.

Cross-trial heterogeneity

ATTR-ACT and ATTRibute-CM differ in populations, endpoints, and baseline event rates. Any indirect comparison between acoramidis and tafamidis is hypothetical; no head-to-head data exist.

No individual patient data

Matching-adjusted indirect comparison (MAIC) was not possible; residual confounding remains.

No Slovak ATTR-CM registry

Trial-based projections are not validated against Slovak real-world data; DRG unit cost may underestimate complex admissions.

Refs: Babela et al. Lek Obz 2026;75(2), Discussion & Limitations. · Cross-trial caveats anchored to Maurer 2018 and Gillmore 2024.

Conclusions - policy implications

Reductions in CV / HF hospitalisations observed with TTR stabilizers translate into tangible Slovak hospital-budget savings.
Acoramidis: dominant profile (saves cost + gains QALYs) under the hospitalisation-only perspective.
Tafamidis: highly favourable ICER (€450.23 / QALY) on the same perspective.

FOUR POLICY ACTIONS FOR SLOVAKIA AND CEE

1 Establish a national ATTR-CM registry

Admissions, length of stay, readmissions, longitudinal HRQoL — validated instruments.

2 Expand specialised ATTR-CM diagnostic & treatment centers

Build a national network of reference centers with cardiac-amyloidosis expertise; reduce geographic barriers to specialist access.

3 Improve clinical pathways & primary-care awareness

Deploy red-flag algorithms and referral protocols; raise GP and cardiologist awareness to cut the 3.5-year diagnostic delay — timely diagnosis can extend life expectancy by up to 8 years.

4 Benchmark within European ATTR-CM networks

Collaborate for comparability while preserving Slovak cost structures.

Refs: Babela et al. Lek Obz 2026;75(2), Conclusions. · Slovak Law 153/2013 on the national healthcare information system.

Thank you

Questions & discussion

Robert Babela

Slovak Medical University · Project HealthCare (PHC), Bratislava

robert.babela@szu.sk

Full article: Babela R, Hlavata T, Polak P. Hospitalization-driven economic effects of new treatments for transthyretin amyloid cardiomyopathy in Slovakia. Lekársky Obzor 2026; 75(2): 50–57. · www.lekarskyobzor.sk