



EE610

Opportunities to Improve the Cost Effectiveness of the Care Pathway in Acute Ischemic Stroke: A Decision Tree Analysis

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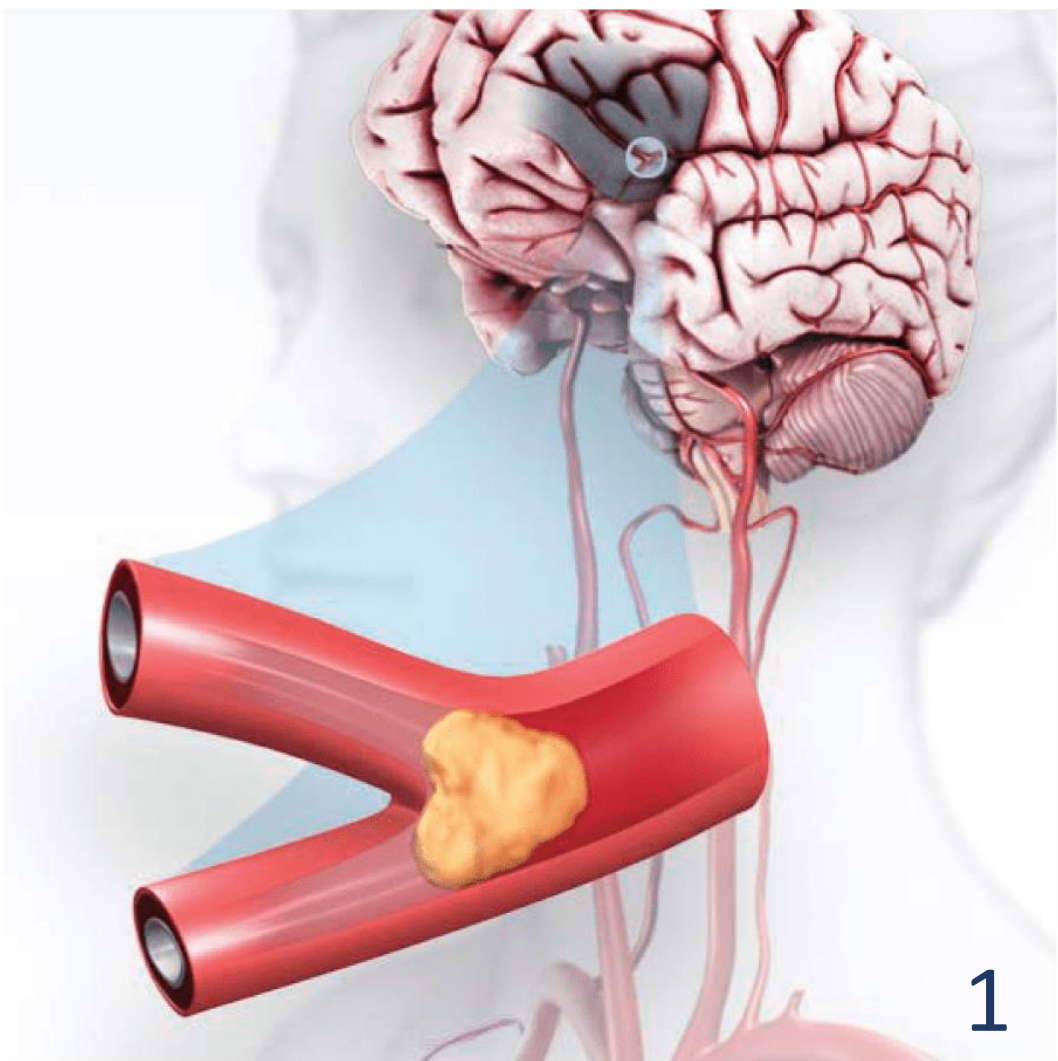
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Introduction

Acute ischemic strokes, sudden interruption of blood flow to the brain, have a significant impact on both society and healthcare economics.

- One of the leading causes of death and disability in US
- Yearly ~795.000 in US have a stroke¹
- High societal costs of stroke (\$56.6 billion in US 2018-19)¹
- Each minute a stroke untreated, 2 million neurons are lost²

1. American Stroke Association
2. Saver JL et al. Stroke 2005



Aim

As innovations emerge to improve outcomes, the pressing question becomes, which innovations have the strongest potential to improve the quality of stroke care?

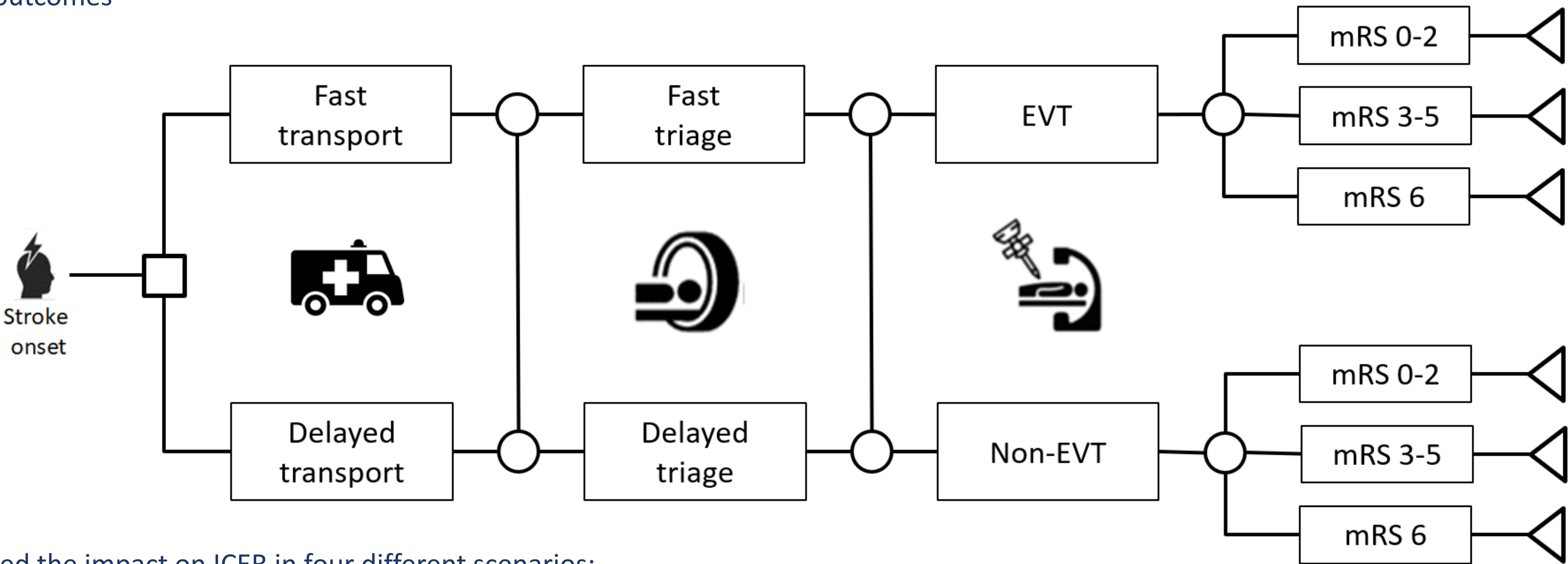
This study estimated the relative importance of opportunities to improve health economic outcomes along the care pathway in acute ischemic stroke.

Methods

A decision tree was constructed (picture below).

Including chance nodes for:

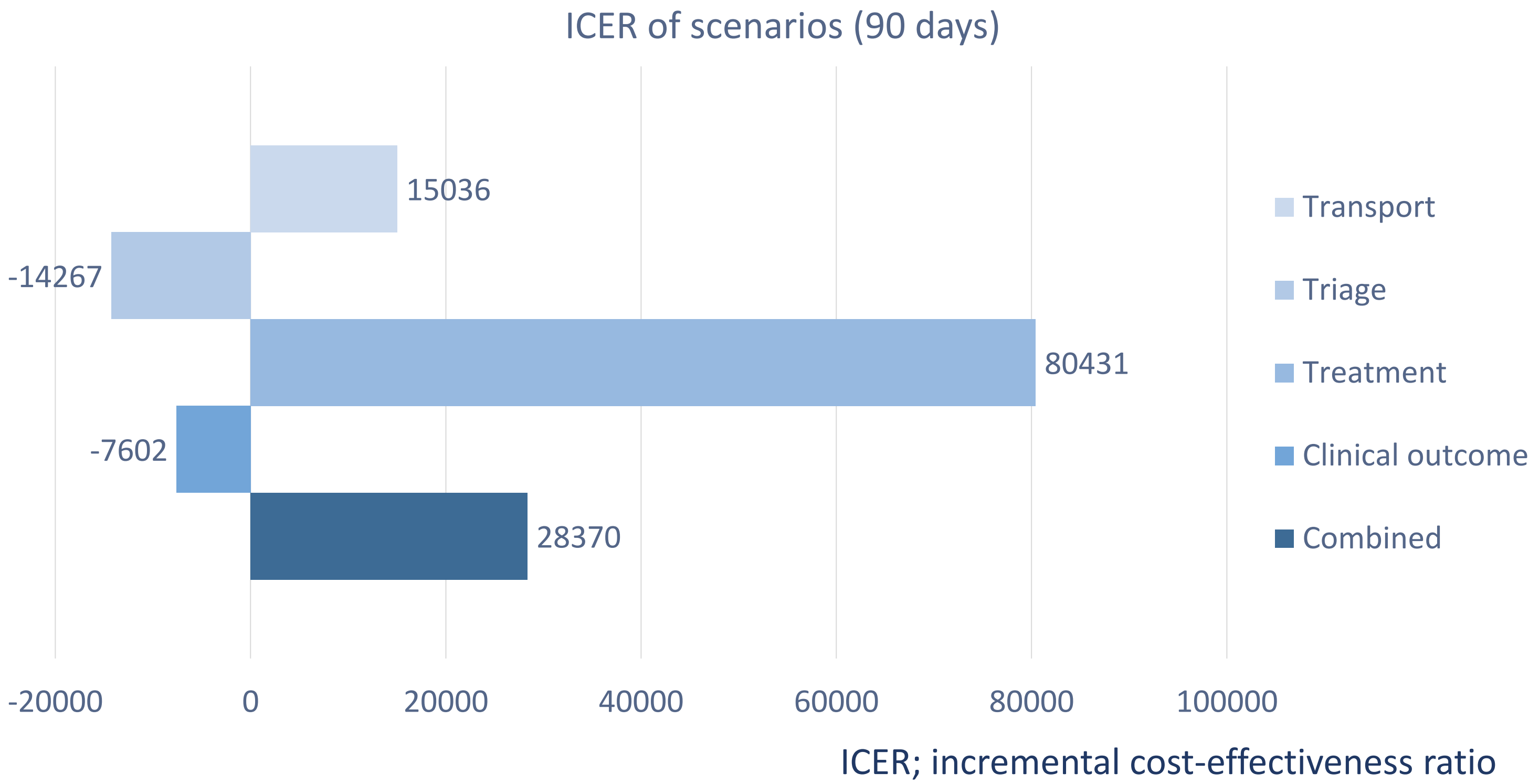
- Transportation (onset to door time)
- Diagnostic triaging (door to treatment time)
- Treatment
- Clinical outcomes



We analysed the impact on ICER in four different scenarios:

- 20% improvement towards optimal transportation time,
- 20% improvement towards optimal triaging time,
- Improved EVT rate to 10% (expected rate in 2028 by Rai AT. et al.),
- 20% improvement towards optimal effectiveness fast-access EVT

Results



The ICER was most sensitive to:

- 1) Fast triaging
- 2) More effective fast-access EVT
- 3) Fast transportation
- 4) More EVT

All ICERs were below a willingness to pay threshold of \$100k per QALY gained.

The results show that the door-to-treatment time is most important in improving health economic outcomes in stroke care.

Conclusion

The insights gained help to shape an innovation strategy that is meaningful in improving care for patients suffering from an acute ischemic stroke.

Including the long-term costs of stroke survivors in the model are likely to be in favor of the cost-effectiveness of EVT.

Further research will include real-world data to optimize the model and the results.

Schematic view of the components of each scenario
EVT; endovascular thrombectomy, mRS; modified Rankin Scale

Parameter	Current practice	Scenario value	References
Probability fast transport	0.45	0.56	Jahan R. et al. JAMA 2019
Probability fast triage	0.65	0.72	CDC 2007
Probability EVT	0.06	0.1	Rai AT. et al. J NeuroIntervent Surg 2022
Probability mRS 0-2	0.53	0.62	Saver JL. et al. JAMA 2016
Costs EVT	\$15510		Ospel J. et al. Stroke 2023
Costs non-EVT	\$7421		Ospel J. et al. Stroke 2023
Costs within first 90 days after stroke for mRS score 0-2/3-5/6	\$14382/\$17879/\$23498		Peultier A. et al. JAMA Netw Open 2020
Utility mRS score 0-2/3-5/6	0.78/0.32/0.0		Peultier A. et al. JAMA Netw Open 2020

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