# Radiofrequency renal denervation for uncontrolled hypertension: a cost-effectiveness analysis based on the SPYRAL HTN-ON MED trial for the Colombian healthcare system

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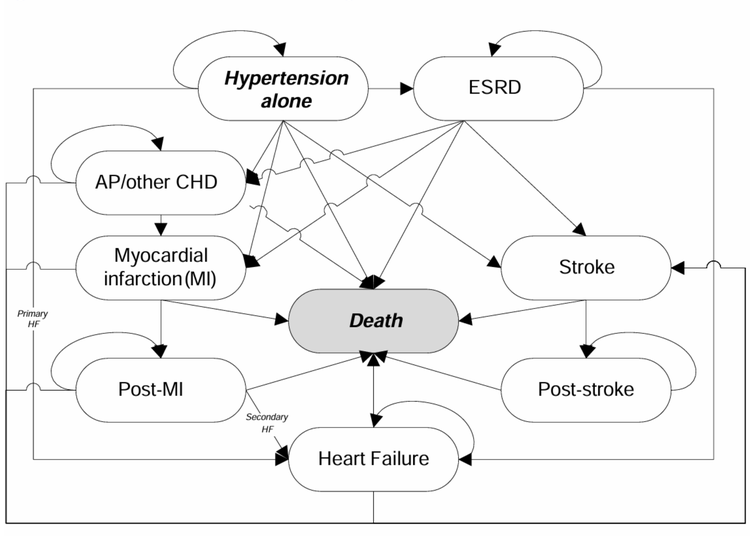
## Objectives

- Radiofrequency renal denervation (RF RDN) is a guideline-recommended adjunctive treatment for uncontrolled hypertension, including resistant hypertension (rHTN). [1-3]
- This study evaluated the cost-effectiveness of RF RDN in the Colombian healthcare system.

***Figure 1*** *Model Schematic, illustrating health states modeled.[4]*




## Methods

- A validated decision-analytic Markov model (Figure 1) based on multivariate risk equations, including the Framingham equations, was used to model projected clinical events, quality-adjusted life years (QALYs) and costs over a lifetime horizon.[5]
- Relative risks of clinical events were projected for stroke, myocardial infarction (MI), angina pectoris/coronary heart disease (AP/CHD), heart failure (HF), end-stage renal disease (ESRD), cardiovascular death (CVD) and all-cause death (ACD).
- Clinical event risk reductions resulting from changes in office systolic blood pressure (oSBP) were based on a meta-regression of 47 hypertension randomized-controlled trials.[6]
- The base case effect size of -4.9 mmHg oSBP reduction (treatment vs. sham control) was derived from the SPYRAL HTN-ON MED study, in which both groups maintained use of up to three antihypertensive medications.[7]
- Scenario analyses were informed by a SPYRAL HTN-ON MED subgroup treated outside the US (OUS) and on 3 antihypertensive (AH) medications, as well as 24-month follow-up data from the SPYRAL HTN-ON MED full cohort. [8,9]
- The analysis was conducted from the perspective of the Colombian healthcare system, with costs (in US$, $1 USD = $4,047 COP) [10] and effects discounted by 3%.
- The lifetime incremental cost-effectiveness ratio (ICER) was evaluated against the accepted willingness-to-pay (WTP) threshold of three-times the Colombian gross domestic product (GDP) per capita per QALY gained.[11]

***Table 1*** *Key input parameters.*

| Parameter | Value | Source |
|---|---|---|
| **Age** (Years) | 55.0 | Kandzari et al., 2023 (SPYRAL HTN-ON MED Trial full cohort)[5] |
| **Gender** (% Female) | 19.9% | |
| **Baseline oSBP** | 163 mmHg | |
| **Treatment Effect** (oSBP vs. sham control) | -4.9 mmHg | |
| **Discount Rate** (Costs, Effects) | 3.0% p.a. | |
| **Costs (annual, USD)** | | |
| **Hypertension** (Year 1+) | $621 | Manual SOAT 2024, SISMED Colombia and Medtronic Colombian ASP costs FY25 |
| **Stroke** (Acute, Year 1, Year 2+) | $8,673; $1,732; $619 | Manual SOAT 2024, SISMED Colombia and Medtronic Colombian ASP costs FY25 |
| **MI** (Acute, Year 1+) | $3,437; $1,365 | Manual SOAT 2024, SISMED Colombia and Medtronic Colombian ASP costs FY25 |
| **AP** Stable (Year 1+); Unstable (Year 1+) | $1,002; $1,039 | Manual SOAT 2024, SISMED Colombia and Medtronic Colombian ASP costs FY25 |
| **HF** (Initial; Year 1+) | $643; $6,232 | Tamayo D, et al., 2013 [12]; Manual SOAT 2024 and Medtronic Colombian ASP costs FY25 |
| **ESRD** (w/o and with Diabetes, Year 1+) | $24,524; $25,367 | SARMIENTO-BEJARANO, Hernán, et al. 2019 [13] |
| **RF RDN Treatment** (one-time procedure) | $5,150 | Manual SOAT 2024 and Medtronic Colombian ASP costs FY25 |

***Figure 2*** *Ten-Year Clinical Event Relative Risks (RR), RF RDN vs. SoC.*

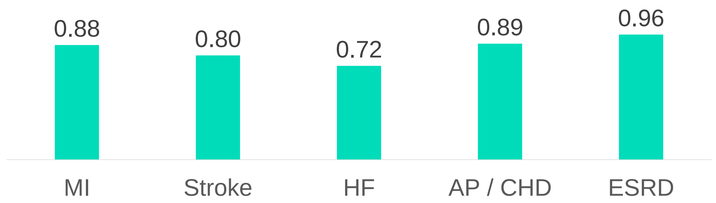
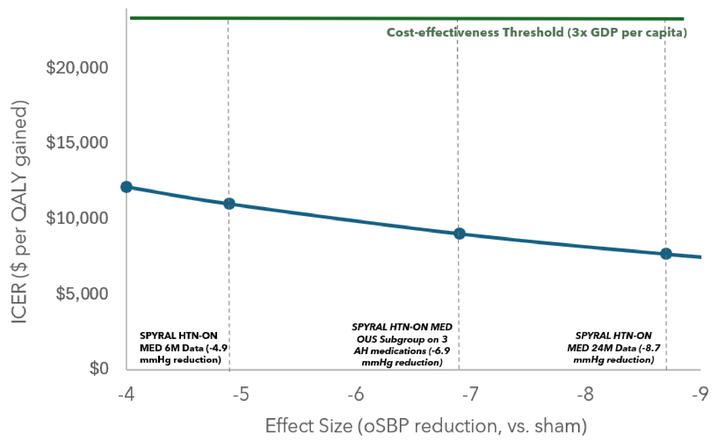


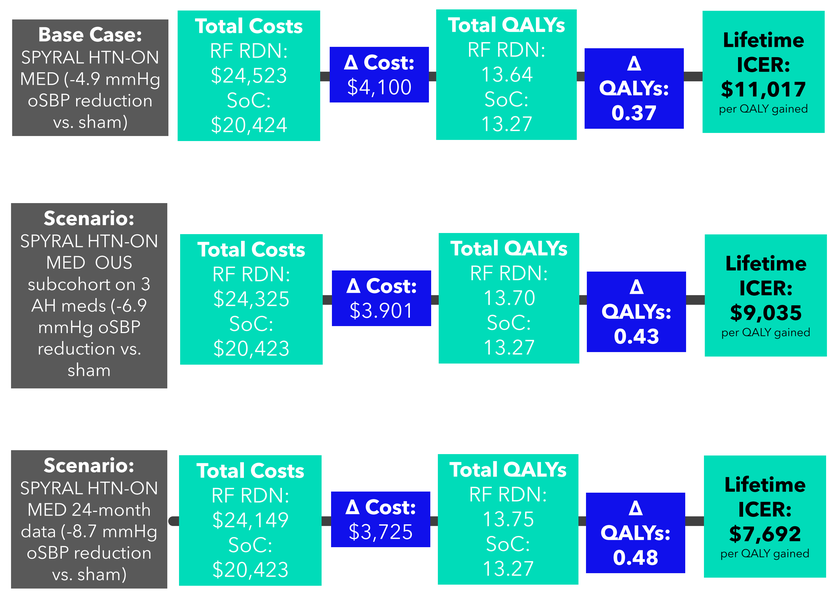

***Figure 4*** *Lifetime ICER with respect to Cost-effectiveness Threshold.*




## Results

- At 10 years, RF RDN resulted in significant clinical event risk reductions (0.80 for stroke, 0.88 for MI, 0.89 for AP/CHD, 0.72 for HF, 0.96 for ESRD, 0.86 for CVD, and 0.94 for ACD, respectively) (Figure 2).
- Compared to a sham control and over a patient's lifetime, RF RDN led to a 0.37 QALY gain at an incremental cost of $4,100, yielding an ICER of $11,017 per QALY gained, below the three-times GDP per capita WTP threshold of $23,750 per QALY (USD).
- Cost-effectiveness was further improved in scenario analyses of effect size assumptions explored (Figure 3).

***Figure 3*** *Cost-effectiveness results over lifetime.*




## Conclusions

According to model-based projections, RF RDN is expected to be a cost-effective treatment for uncontrolled hypertension, including rHTN, in the Colombian healthcare system.

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