# Rheumatoid Arthritis in Colombia

by

Juan Carlos Méndez

jc.mendez (at) uniandes.edu.co

for

Hospital Militar

Final Project for Class ISIS 4822 - Visual Analytics 2018
Universidad de los Andes

Url: http://jcmendez.gkudos.com/ar/

# What is Rheumatoid Arthritis (RA)?

***Rheumatoid arthritis (RA)*** *is an* ***autoimmune disease*** *that can cause joint pain and damage throughout your body.* ***There's no cure*** *for RA. In addition to to* ***physical and emotional pain****. It is considered as a* ***high-cost disease****.*

As someone once said,

For any country, health problems are really money problems

Icons from https://www.flaticon.com/

For a country like Colombia, where health resources are scarce, it is really important trying to understand how  $$ is spent.

Physicians and Health professional interested in RA usually would like to know...

Costs of procedures per Persons are the same across the country? Do they differ by sex, age or regime?

Does the available data has a “good enough” quality?

Which procedures are the most expensive or most used?

Which administrators and providers have the most expensive costs per person?

... but it isn't a secret that in Colombia Health information technology its too limited in comparison to other countries

Wouldn't be great to have a visual and interactive tool that could help Health professionals to use the available data and **Discover** the **distribution** of **Costs per Person (CP)** of **RA** procedures in Colombia by attributes like state, year, regime, sisben, sex, age group, administrator or provider?

Let me introduce you the Interactive  Dashboard to analyze Rheumatoid Arthritis in Colombia using data of Costs of procedures  per Person...

# Rheumatoid Arthritis in Colombia

Home Costs Insights About

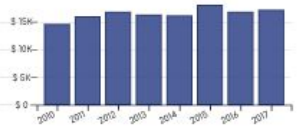
by Juan Carlos Méndez

## Costs per Person

Clear Filters

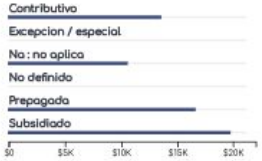
| Costs per Person (C/P) | People Served | Total Costs |
|---|---|---|
| $16K COP | 41461 | $663.2M COP |

Years

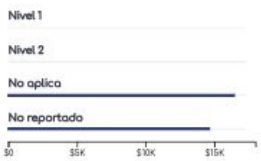



States

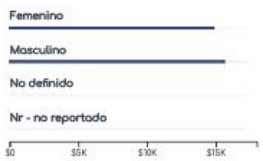
Regime




Sisben

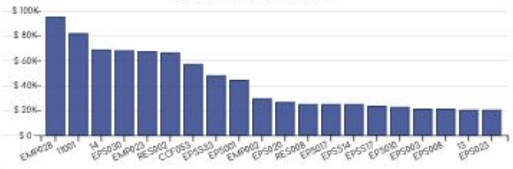



Sex

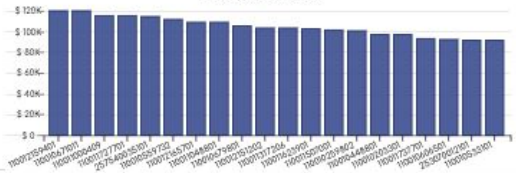



Age Group

Administrators (Top 20)




Providers (Top 20)



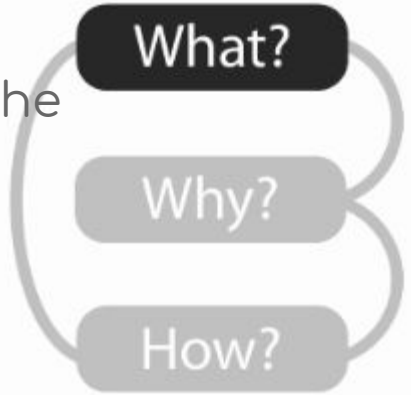

Procedures

| CUPS | Name | Cost per Person | People Served | Total Costs |
|---|---|---|---|---|
| 920701 | Gamagrafía hepatoesplenica | 111505 | 1 | 111505 |
| 901407 | Prueba intradermica de alergias con escarificacion o puntura (aeroalergenos, alimentos, venenos de insecto... | 110930 | 2 | 221860 |
| 999100 | Acupuntura y terapia neural sod + | 110000 | 1 | 110000 |
| 873305 | Radiografía panoramica de miembros inferiores (goniometria u ortograma), en formato 14 x 36 (adultos) + | 109031 | 1 | 109031 |
| 920901 | Gamagrafía osea (corporal total o segmentaria) + | 106836.2 | 5 | 534181 |
| 901003 | Antibiograma (mic) metodo manual | 106680 | 1 | 106680 |
| 541302 | Drenaje de colección intraperitoneal (epiploico, omental, periesplenico, perigastrico, subhepatico, subfrenico... | 105734 | 1 | 105734 |
| 893821 | Prueba de broncomotricidad con ejercicio y monitoreo + | 102577.333333333333 | 3 | 307732 |

Total Items: 694

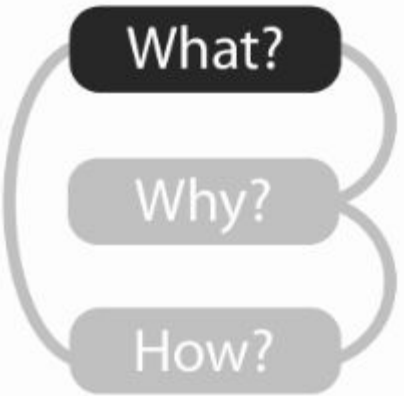
# Main Dataset : SISPRO

- Administrative Database with Medical services given to patients in Colombian health system, filtered by Diagnostic codes for Rheumatoid Arthritis.
- Dataset Type: Table, Temporal
- Attributes
- States : Categorical. States of Colombia
- Year: Categorical, orderered, sequential. Year of the procedure.
- Regime : Categorical. Type of health regime to which the patient belongs

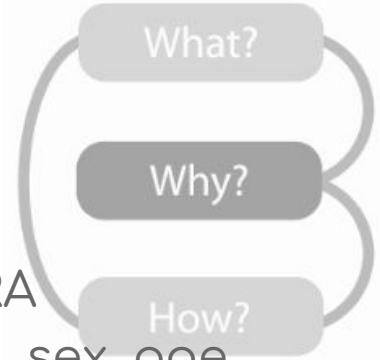


# Main Dataset : SISPRO

- Sisben : Categorical. Subtype of Subsidized regime.
- Sex : Categorical.
- Age Group: Categorical, ordered. Age Groups classified by human cycle.
- Administrator: Categorical. Administrators of the Social Security System
- Provider: Categorical. Company that provides a medical service.
- Procedure: Categorical. Procedures and medical services performed in Colombia
- Procedure Cost: Quantitative, ordered, sequential. Cost of a procedure applied to a patient.
- People Served : Quantitative, ordered, sequential. Number of people



# Tasks

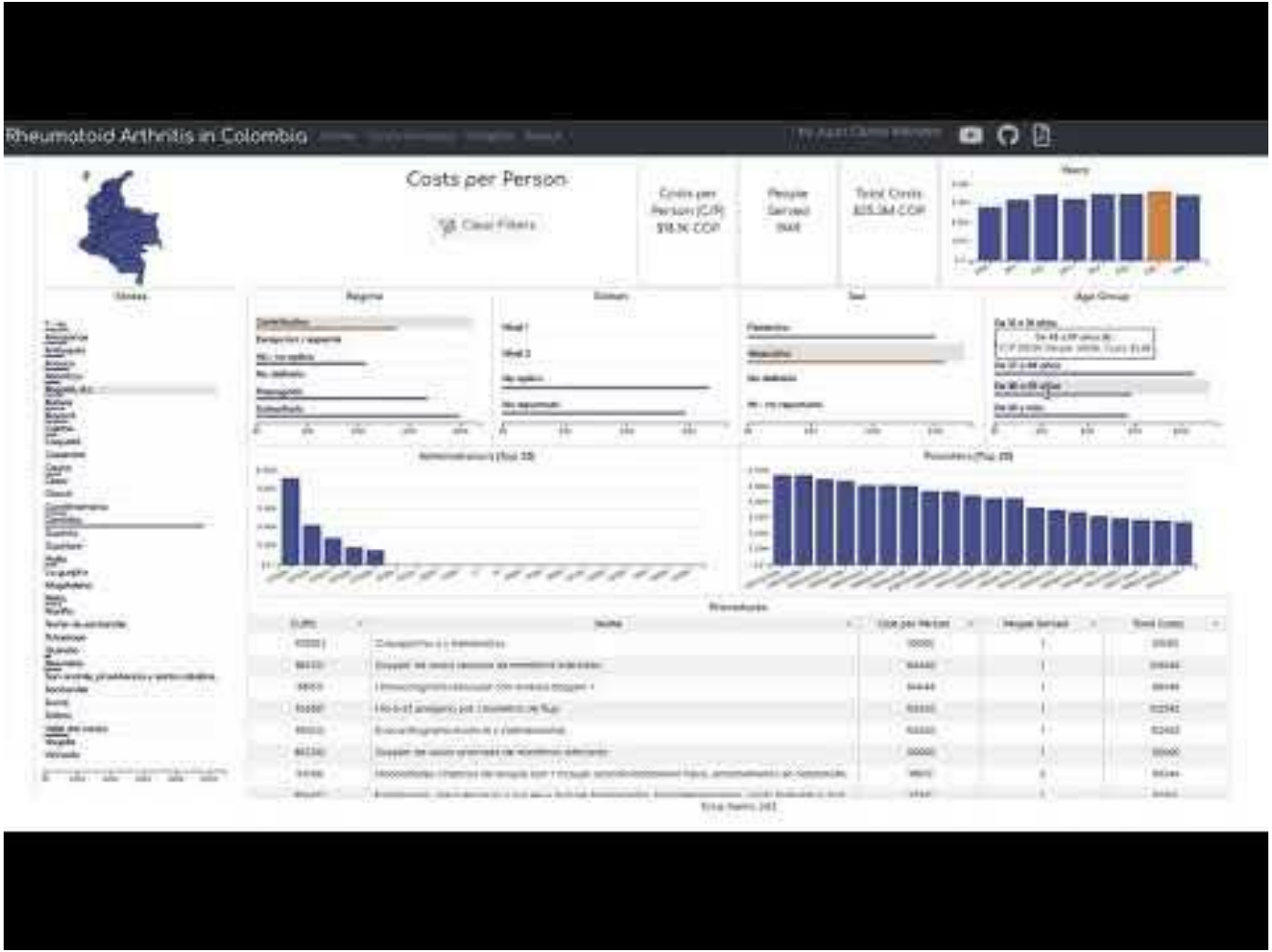



**Main Task:**

- **Discover** the **distribution** of Costs per Person (CP) of RA procedures in Colombia by state, year, regime, sisben, sex, age group, administrator and provider.

**Secondary Tasks:**

- **Derive** attributes from raw data as **features** to be used in the final visualization.
- **Identify Outliers** in costs.
- **Identify** the **Features** of a specific procedure in the dataset.
- **Summarize** the **distribution** of Costs per Person, people served and total costs of RA procedures in Colombia.

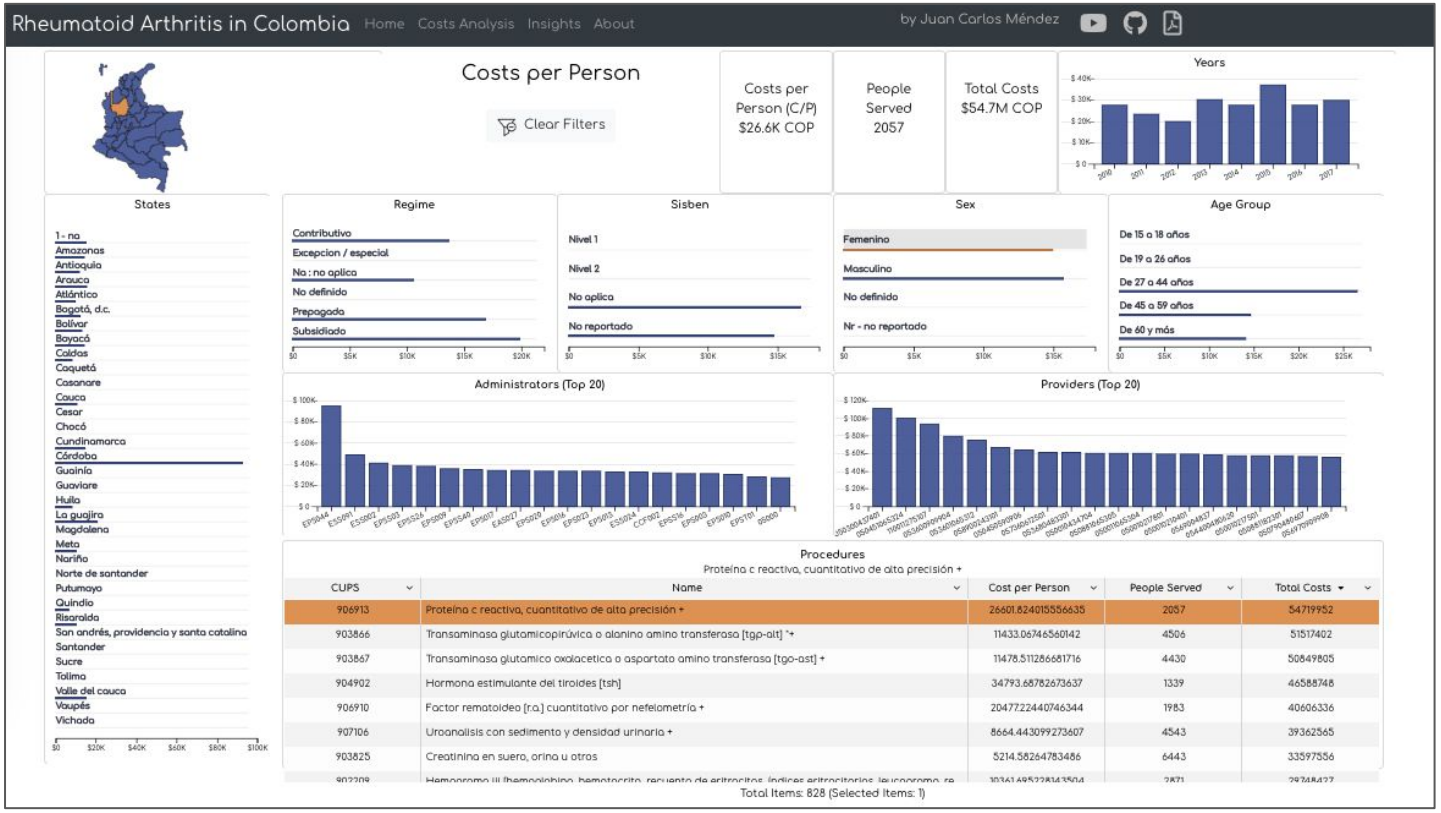

Rheumatoid Arthritis in Colombia
Costs per Person
Clear Filters
Costs per Person (C/P)
People Served
Total Costs
Years
Stress
Regime
Domain
Sex
Age Group
Administrators (Top 10)
Providers (Top 10)
Procedures

What?

Why?

How?

# Demo




What?

Why?

How?

# Insights

- There are data quality problems like these:
  - Some states do not have data for one or more years (e.g Amazonas, Arauca, Casanare, Guainía, Guaviare)
  - There are "Not Reported - NR" and "Not Available - NA", values in some of the attributes. Such kind of *"data loss"* problem should be mitigated by data publishers in order to improve the general data quality of the dataset.
  - The expert found different NIT providers with the same name.
- The overall Costs per Person (C/P) for procedures is higher for younger people.

# Insights

- The overall C/P is higher for well known isolated states like Chocó, Guainía, La Guajira , Putumayo , Arauca, Vaupés and Vichada.
- For every year of the dataset Córdoba is the State with the highest C/P.
- There are anomalies in procedure costs that reflect problems during data collection (e.g. procedures with cost of $1 COP)
- According to the expert, the costs of some procedures in the database differ *a lot* from the official rates established for the country. ( SOAT DECRETO 2423 DE 1996] and its yearly updates)
- There is a huge number of persons (65k) with RA that belong to the subsidized (*subsidiado*) regime. According to the expert, usually that group of people doesn't have access to the most advanced or modern procedures due to the high costs of them.
- There are more women affected with the decease, but costs for men are higher

Thanks