



Decision Support System for assessing management interventions in a Mental Health ecosystem



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ABSTRACT

Here it is included the pseudocode for the Decision Support System for assessing management interventions in a Mental Health ecosystem. This pseudocode can be used to reproduce the experiments that we have carried out in Bizkaia (Basque Country, Spain).

1: **DSS procedure**

2: The solution pool (SP) is cleaned

3: **For** $j=1$ to j_{max} **do** \rightarrow being j the simulation number and the maximum number of simulations

4: **For** $i=1$ to i_{max} **do** \rightarrow being i the scenario number and the maximum number of scenarios

5: **For** $k=1$ to k_{max} **do** \rightarrow being k the SHA (DMU) number and the number of SHA

6: Original dataset S_{ijk} \rightarrow the Monte-Carlo simulation engine selects at random a value for each simulation, variable and SHA k according to their specific statistical distributions.

7: Calculate D_{ijk} and O_{ijk} \rightarrow the fuzzy inference engine determines the day care and outpatient care fuzzy sets and membership degrees for each SHA

8: Calculate R_{ijk} \rightarrow the fuzzy inference engine determines the range for variable value interpretation according to the B-MHCCM

9: Interpreted dataset I_{ijk} \rightarrow the original dataset S_{ijk} are interpreted by the fuzzy inference engine according to the B-MHCCM

10: Calculate RTE_{ijk} scores \rightarrow variable returns to scale Data Envelopment Analysis (DEA) model (both input and output-oriented)

11: Save RTE_{ijk} scores in the solution pool

12: **end for**

13: **end for**

14: **end for**

15: **end procedure**

EXTERNAL LINK

<https://doi.org/10.1371/journal.pone.0212179>

THIS PROTOCOL ACCOMPANIES THE FOLLOWING PUBLICATION

García-Alonso CR, Almeda N, Salinas-Pérez JA, Gutiérrez-Colosía MR, Uriarte-Uriarte JJ, Salvador-Carulla L (2019) A decision support system for assessing management interventions in a mental health ecosystem: The case of Bizkaia (Basque Country, Spain). PLoS ONE 14(2): e0212179. doi: [10.1371/journal.pone.0212179](https://doi.org/10.1371/journal.pone.0212179)

PROTOCOL STATUS

Working

GUIDELINES

In order to carry out the analysis it is necessary:

- To have data of service provision in the mental health areas to be analyzed.
- To design a computer-based decision support system according to the pseudocode provided.
- To have the interpretation process according to the Basic Mental Health Community Care Model.
- To describe in causal terms the intervention that has to be analyzed.

SAFETY WARNINGS

It is very important:

- To describe the intervention in causal terms for identifying all the variables concerned.
- To analyse the initial ranges for the interpretation of variable values according to the Basic Mental Health Community Care Model.
- To check all the model parameters.

BEFORE STARTING

- Dataset on service provision must be carefully checked.
- All the variables concerned by the intervention analysed have to be identified and changed.
- Outcomes have to be estimated.

1 DSS procedure

2 The solution pool (SP) is cleaned

3 **For** $j=1$ to **do** → being j the simulation number and the maximum number of simulations

4 **For** $i=1$ to **do** → being i the scenario number and the maximum number of scenarios

5 **For** $k=1$ to **do** → being k the SHA (DMU) number and the number of SHA

6 Original dataset **S** _{ijk} → the Monte-Carlo simulation engine selects at random a value for each simulation, variable and small health area (SHA) k according to their specific statistical distributions

7 Calculate **D** _{ijk} and **O** _{ijk} → the fuzzy inference engine determines the day care and outpatient care fuzzy sets and membership degrees for each SHA

8 Calculate x_{left} and x_{right} for each simulation, scenario and SHA → the fuzzy inference engine determines the range for variable value interpretation according to the B-MHCCM

9 Interpreted dataset **I** _{ijk} → the original dataset **S** _{ijk} are interpreted by the fuzzy inference engine according to the B-MHCCM

10 Calculate **RTE** _{ijk} scores → variable returns to scale Data Envelopment Analysis (DEA) model (both input and output-oriented)

11 Save **RTE** _{ijk} scores in the solution pool

12 **end for**

13 **end for**

14 **end for**

15 **end procedure**



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