FEB 15, 2019

OPEN ACCESS

DOI:
[dx.doi.org/10.17504/protocols.io.vyke7uw](https://doi.org/10.17504/protocols.io.vyke7uw)

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

Protocol Citation: Carlos Garcia-Alonso 2019. Decision Support System for assessing management interventions in a Mental Health ecosystem. **protocols.io** <https://dx.doi.org/10.17504/protocols.io.vyke7uw>

MANUSCRIPT CITATION: 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)

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

PLOS One

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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 $\text{do} \rightarrow$ being j the simulation number and the maximum number of simulations

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

5: **For** $k=1$ to $\text{do} \rightarrow$ 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 $\text{and} \rightarrow$ 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**

Protocol status: Working

Created: Nov 28, 2018

Last Modified: Feb 15, 2019

PROTOCOL integer ID:
18156

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 START INSTRUCTIONS

- 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** $\rightarrow$ 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 small health area (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 x_{left} and x_{right} for each simulation, scenario and SHA $\rightarrow$ 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