



GuiAR: a new tool for implementation IDEAS guidelines



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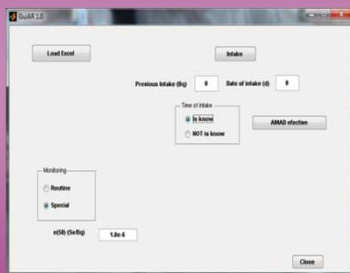
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Abstract

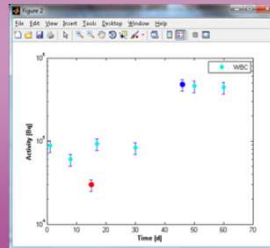
The IDEAS Guidelines provide a method to harmonize dose evaluations using criteria and flow chart procedures to be followed step by step. A Matlab-based computational tool, named GuiAR, was developed to help in IDEAS guidelines implementation. This tool uses a graphical user interface comprising three basic modules: routine monitoring, special monitoring and AMAD effective. This software determines the presence of possible outliers and previous intakes. It works with different bioassay data: urine, faeces and whole body burden simultaneously. It calculates intakes by fitting measurements data with the maximum likelihood method and determines p-values. In case that time of intake is not known, the code allows its determination. On the other hand, if early lung burden and faeces data are available, it is possible to estimate the effective AMAD.

The software GuiAR calculates the intake using maximum likelihood method. Both in the case of routine and special monitoring, takes into account the previous intake. This tool uses a graphical user interface.



The bioassay data, the scattering factors (SF) and the retention fractions must be entered in Excel spreadsheets, one sheet for each type of bioassay data (i.e. urine, faeces, whole body).

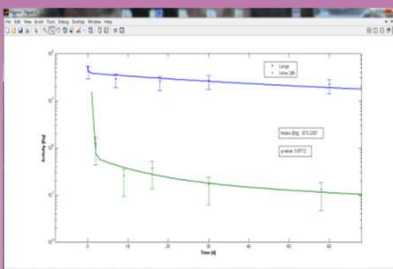
This software determines automatically the presence of possible outliers and others possible intakes. If the measurement is less than SF³ away from the trend of the other data, the data is considered an outlier and marked with red. If the measurement is major than a factor SF³ away from the trend of the other data is considered a new intake and marked with blue.



A set of bioassay data with an outlier (red) and new possible intake (blue).

Special monitoring

This module can calculate the intake considering various types of measurement.



Example of intake estimation for two types of bioassay data (lung and urine of 24 hs).

In the case that time of intake is not known, the code allows its determination. Even determining the date of incorporation, the tool calculates the intake from the appointed day until the day of the first measurement, assuming that the intake occurs the day when p-value is maximum.

Routine monitoring

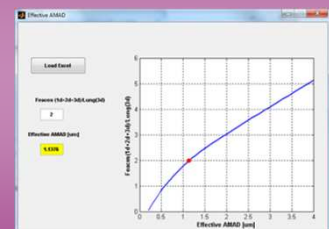
For routine monitoring the software stores in a spreadsheet, the following values: previous intake, P*SF², P/SF², date of intake and E(50) for each period.

Period n: 1	Period n: 2	Period n: 3	Period n: 4	Period n: 5
P [Bq]	P [Bq]	P [Bq]	P [Bq]	P [Bq]
0	0	0	0	0
0	792.31	140.15	28.59	6.28
0	0	0	0	0
0	0	0	1501.27	328.23
0	0	0	0	926.97
I [Bq]	I [Bq]	I [Bq]	I [Bq]	I [Bq]
37372.88	0	68239.37	36639.17	0
P*SF ² [Bq]	P*SF ² [Bq]	P*SF ² [Bq]	P*SF ² [Bq]	P*SF ² [Bq]
0	1276.71	223.99	2436.17	2025.23
P/SF ² [Bq]	P/SF ² [Bq]	P/SF ² [Bq]	P/SF ² [Bq]	P/SF ² [Bq]
0	491.69	87.69	960.71	785.76
Date I	Date I	Date I	Date I	Date I
17-Jan-06	23-Dec-06	26-Mar-07		
E(50) [mSv]	E(50) [mSv]	E(50) [mSv]	E(50) [mSv]	E(50) [mSv]
0.523	0	0.955	0.513	0

Example of the result of routine monitoring.

Effective AMAD

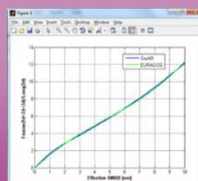
If early lung burden and faeces data are available, it is possible to estimate effective AMAD.



Effective AMAD calculation.

Validation

The software verification was performed using the results of the EURADOS 2009 intercomparison. The effective AMAD was verified by comparing the effective AMAD calculated by GuiAR and the one proposed by EURADOS.



Comparing the calculated effective AMAD by the GuiAR and the one proposed by EURADOS.

Conclusion

The new computational tool made it possible to apply the IDEAS guidelines, in a friendly way. It's used a routine task and academic purposes.

A stand alone code is planned. It is intended to include the effective pathway of intake.

