IMBA Professional Plus
Internal Dosimetry made Simple

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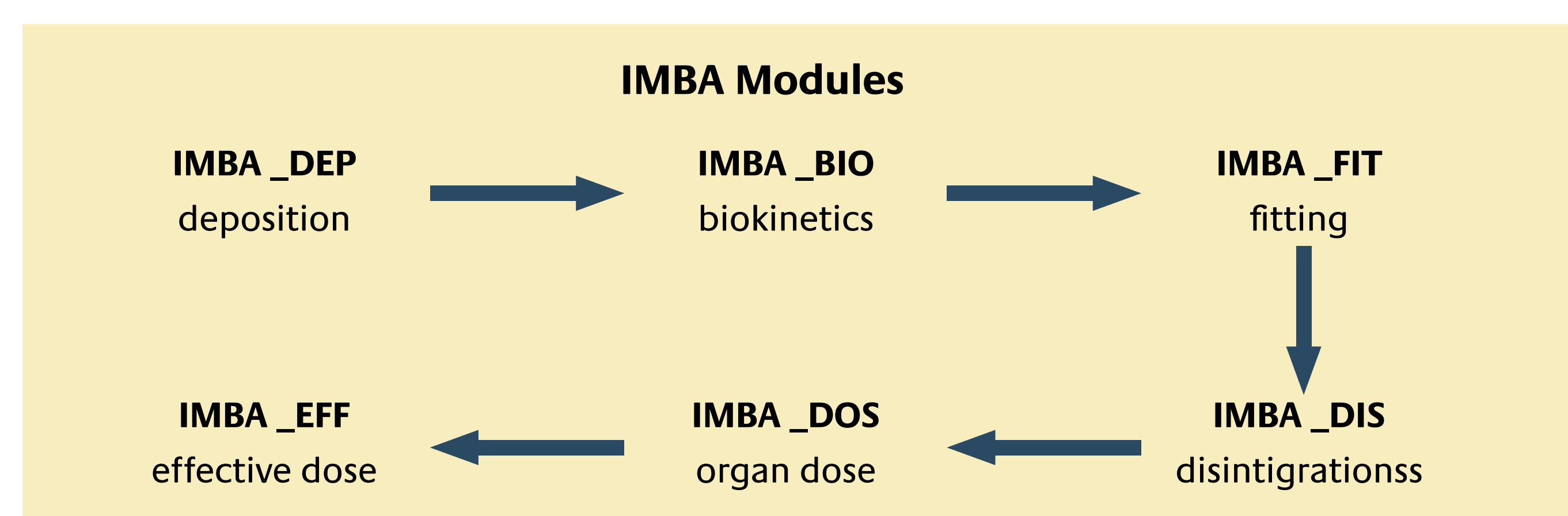N S Jarvis (2)

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Health Protection Agency

Origins

The IMBA concept originated in 1997 to provide the UK Approved Dosimetry Services with a new-generation software required to interpret monitoring data and calculate doses with the new biokinetic models recommended by ICRP.

At its core, are 6 IMBA modules each of which is an independent executable program performing a unique task in the stages of internal dose calculations.

Each module has been extensively quality assured. The key point is that by running these modules in a certain order, it is possible to
- estimate intakes from bioassay measurements
- predict bioassay quantities at specified times after a known intake, and
- calculate doses from known intakes.

IMBA Modules

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IMBA _DEP deposition	→ **IMBA _BIO** biokinetics	→ **IMBA _FIT** fitting
IMBA _EFF effective dose	← **IMBA _DOS** organ dose	← **IMBA _DIS** disintigrationss

Development from 1997 - 2005

- After the IMBA modules, work began on the development of IMBA Expert[TM] software to use the modules in a user friendly way.
- In 2001, IMBA Expert[TM] *USDOE-Edition* was completed for the United States Department of Energy and there are now 25 fully licenced US DOE sites using the software.
- A contract with the CANDU Owners Users Group, Canada to extend the software to deal with radionuclides and vapours arising in CANDU-type reactors followed.
- A third version was developed for OCAS (Office of Compensation, Analysis and Support), USA to aid the calculation of causation probabilities for the US compensation scheme (EEOICPA 2000).
- A UK version IMBA Expert[TM] *UK-Edition* was also developed and is now used routinely by the Approved Dosimetry Services in the UK.
- In order to make the software more accessible to smaller organisations, an off-the-shelf version, IMBA Professional, was developed and made available in January 2004.
- Special versions of IMBA Professional have been developed for universities, and also for the IDEAS international intercomparison exercise.

IMBA Expert[TM] and IMBA Professional have been adopted in many countries around the world

IMBA Modules	IMBA Expert US DOE	IMBA Professional
IMBA Expert CANDU	IMBA IDEAS	
IMBA Expert OCAS	IMBA Academic Edition	

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IMBA Professional Plus Central Concepts

IMPA Professional Plus is the successor of the IMBA Professional and IMBA Expert[TM] series. It is more flexible, more powerful and 6 - 10 times faster. The central concept behind the software is that the nucleus of the program (called the Base Unit) can be installed and run as a separate entity, enabling basic internal dosimetry calculations to be performed. More powerful capabilities (called Add-ons) can be added to the Base Unit as required. Each Add-On can be installed independently, and increases the functionality of the software. The users can thus build up the software to meet their precise requirements.
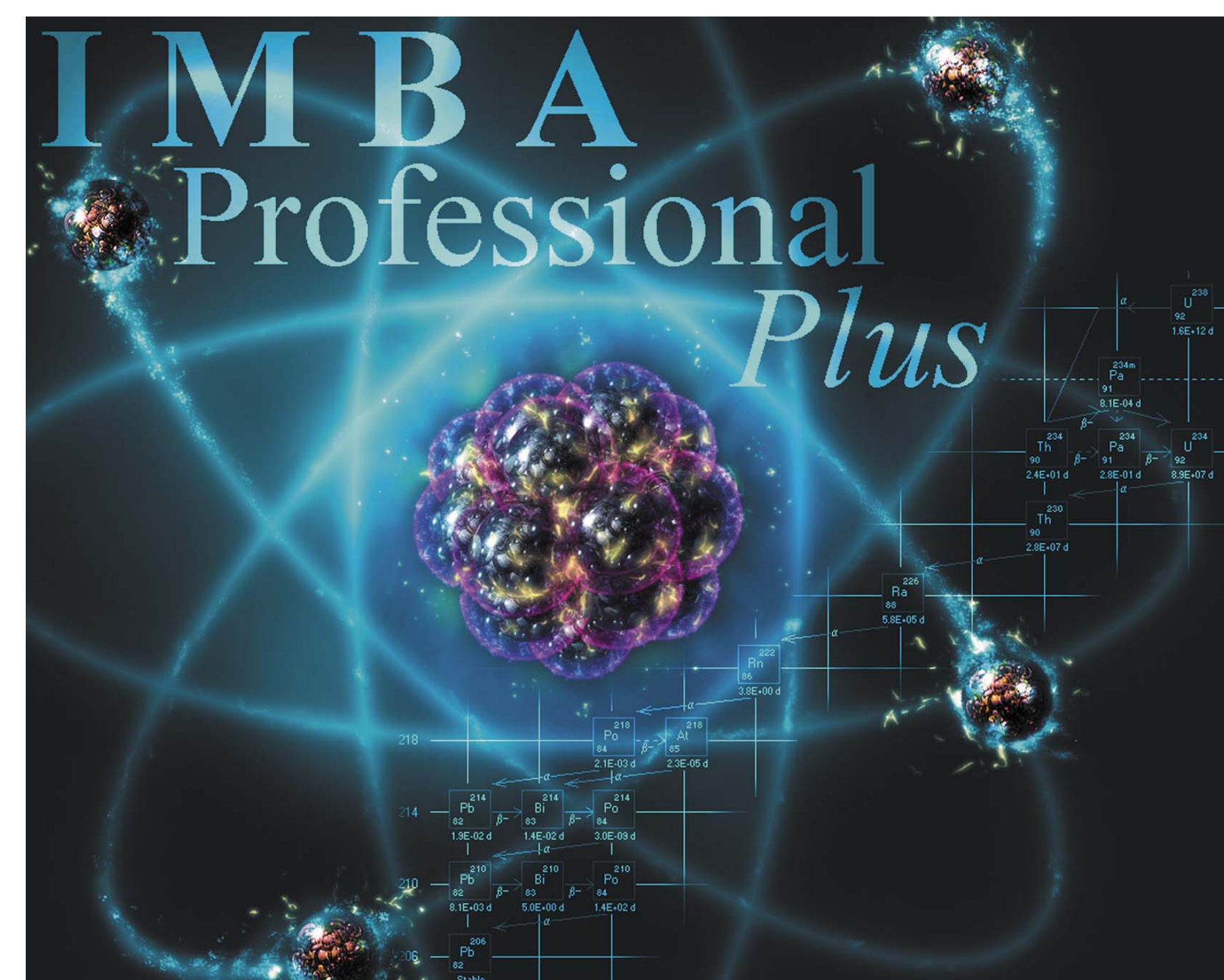
Add-On	Description of Add-On
1	Enables up to 10 independent intake regimes to be specified and used together in calculations
2	Allows different types of measurement data to be used simultaneously in the assessment of intake(s)
3	Enables up to 30 associated radionuclides to be specified and used in dose calculations
4	Used to enable different isotopic mixtures of uranium (eg, enriched, natural) to be specified and used in calculations
5	Implements a generic wound model, enabling intakes via wound to be dealt with
6	In cases where the data is normally distributed, and there is only 1 intake, this Add-On will automatically calculate the error on the estimate of intake
7	Incorporates a Bayesian fitting methodology allowing the user to investigate the effects of different 'prior' knowledge on intake estimates, combine bioassay data with PAS data, and obtain uncertainties in estimates of intakes
8	A tool used to analyse measurements of tritium in urine from a routine tritium monitoring procedure
9	Specifically designed for calculating doses to a specified organ in each calendar year. Used for input into compensation type calculations
10	Enables the ingrowth of ^{241}Am from ^{241}Pu to be automatically allowed for in calculations (Chronic intakes cannot be used with this Add-On)
11	A statistics package giving a quantitative judgement as to the goodness of fit of the assumed models to the measurement data

Main screen. Upper screen defines intake scenario, while parameters can be changed in the bottom half.

A simultaneous fit to the bioassay data in the IDEAS International Intercomparison exercise (case 6).

Radionuclides are selected from a periodic table from which further decay information may be viewed.

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