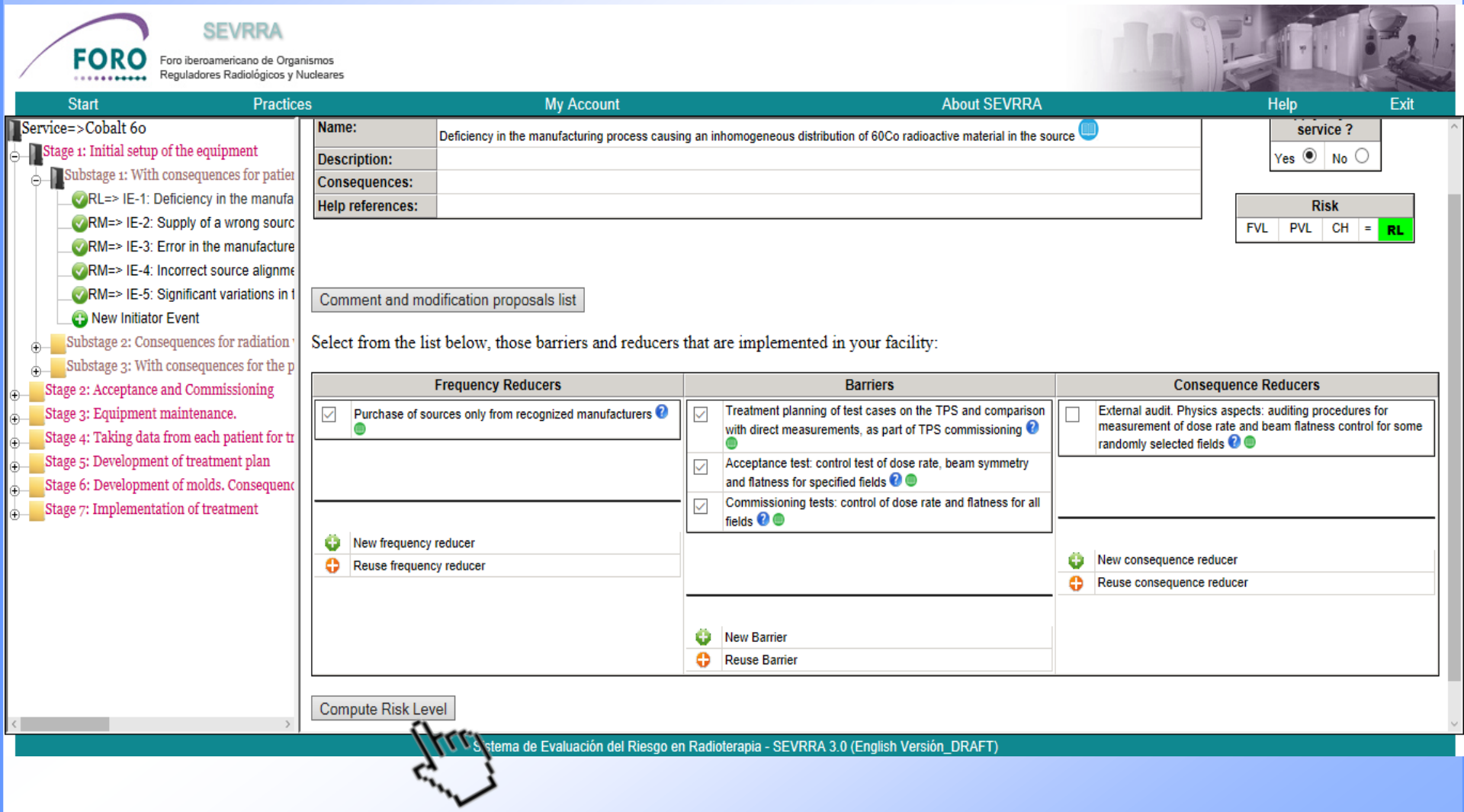
Presentation

SEVRRA SOFTWARE

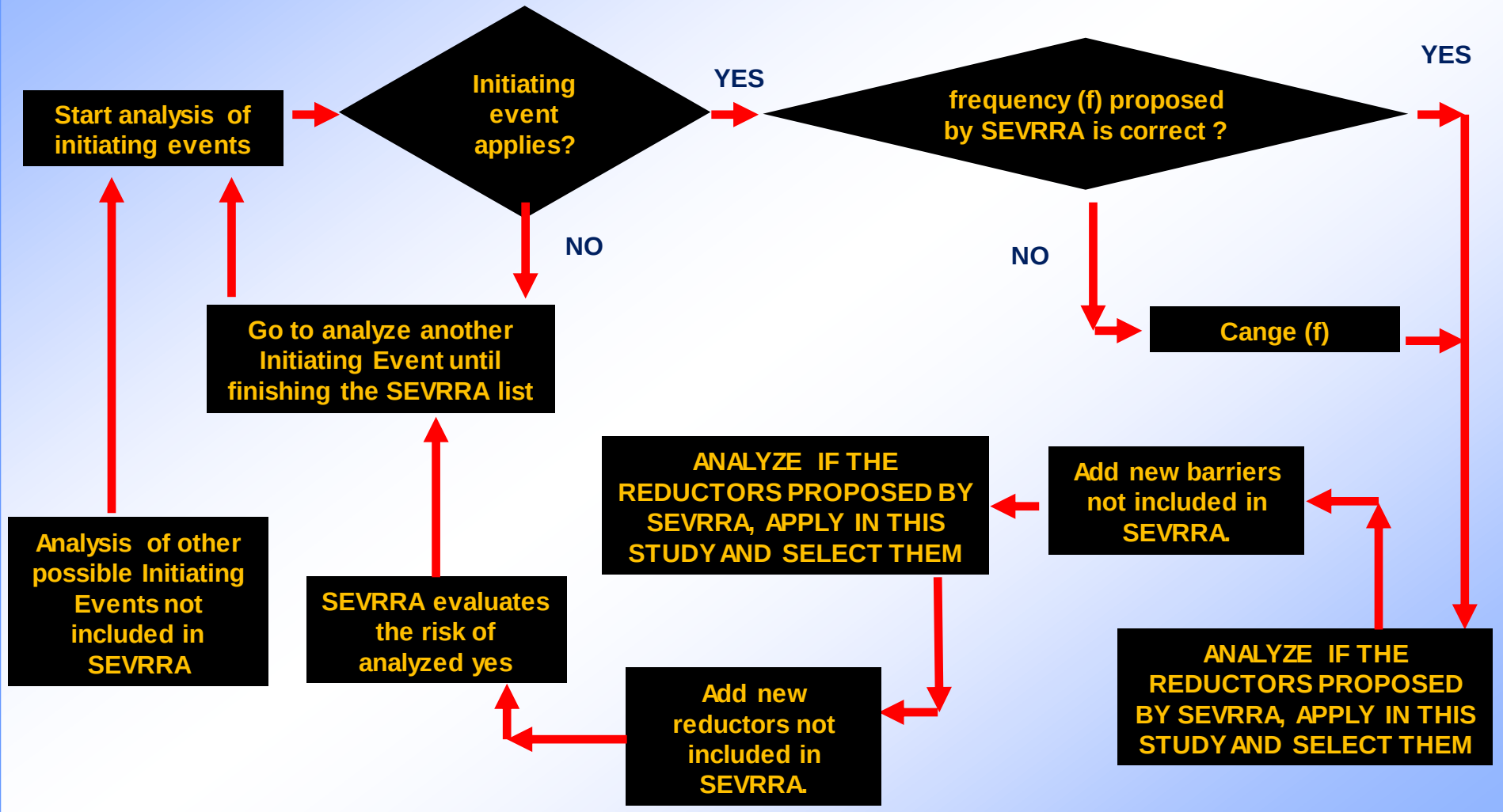
Internacional Atomic Energy Agency

OBJECTIVE

- **Explain SEVRRA app.**

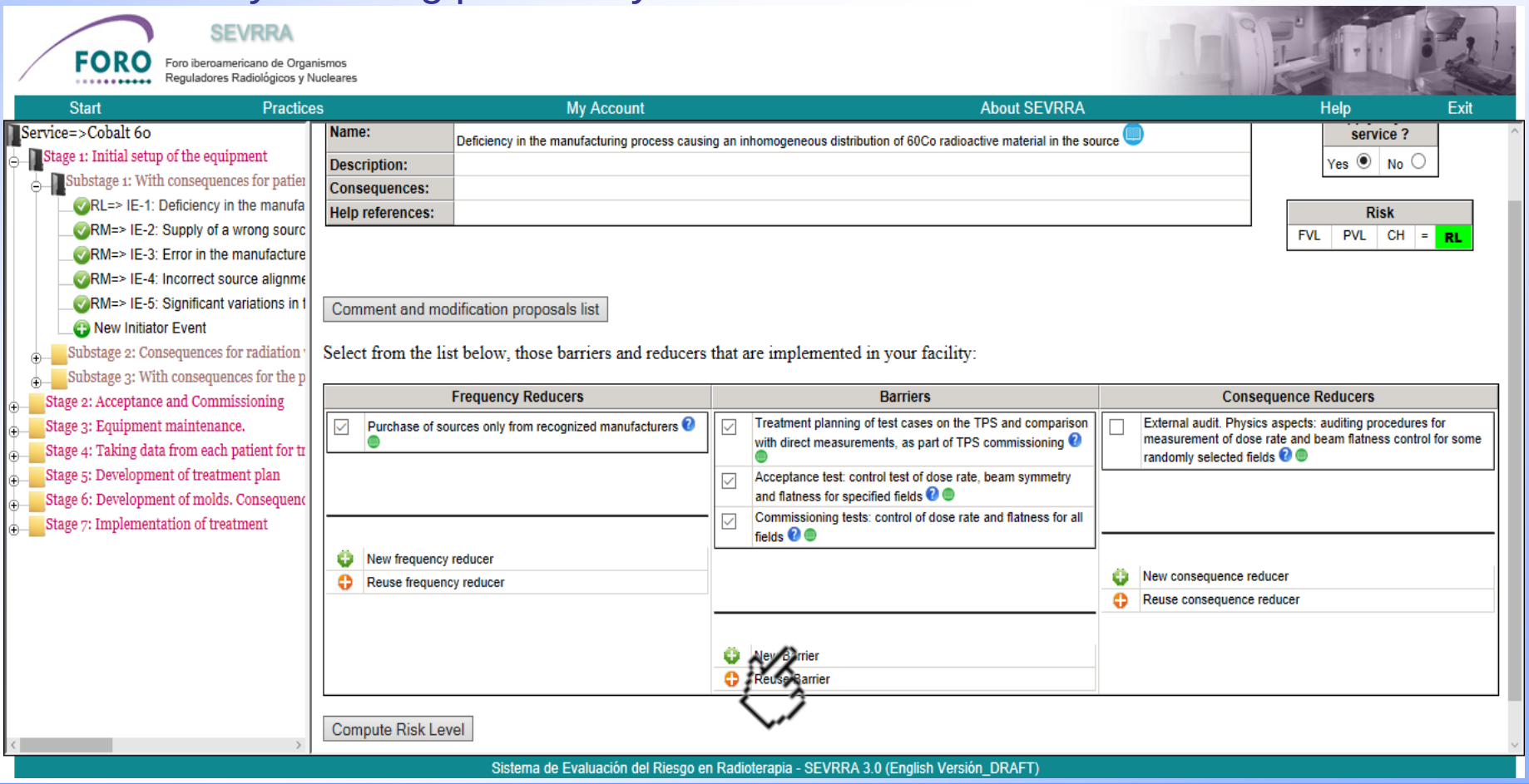


GENERAL CONDITIONS TO APPLY SEVRRA



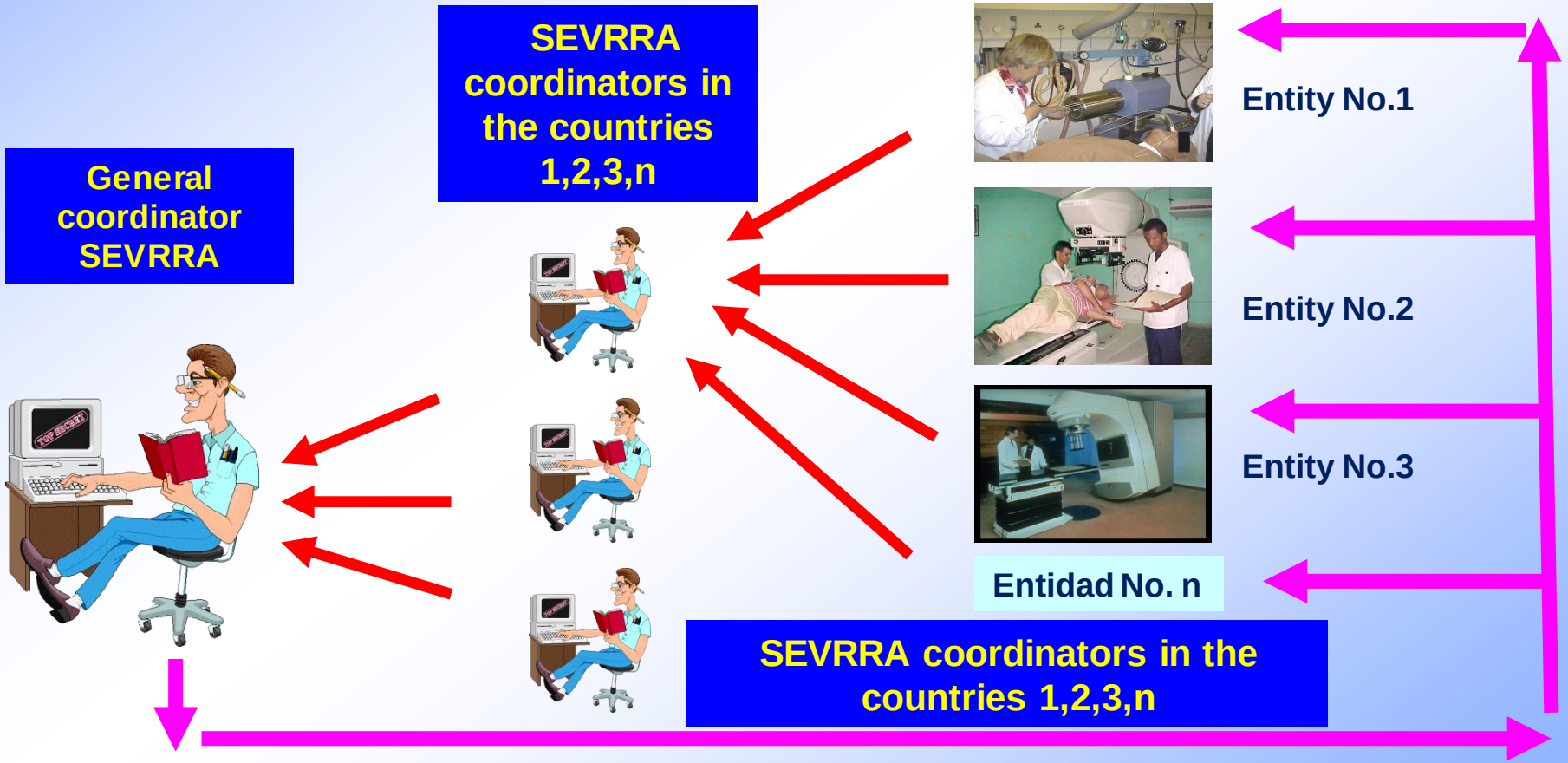
Risk Analysis with SEVRRA.

Once the performance and the impact of barriers, frequency reducers, and consequences reducers in the risk level of the initiating events in Radiotherapy practices has been understood, it is possible to carry out a risk analysis using preferably a software like SEVRRA.



WHAT IS SEVRRA?

SEVRRA, is a software designed as a web platform that allows to use the risk matrix method in radiotherapy using telecobalttherapy, HDR y LDR brachytherapy, and LINAC teletherapy. SEVRRA can also be used in industrial radiography . It will be improved to be used in nuclear medicine and new radiotherapy techniques (IMRT, Radiosurgery, IORT).

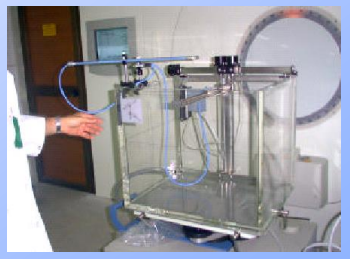


GENERAL CONDITIONS TO APPLY SEVRRA

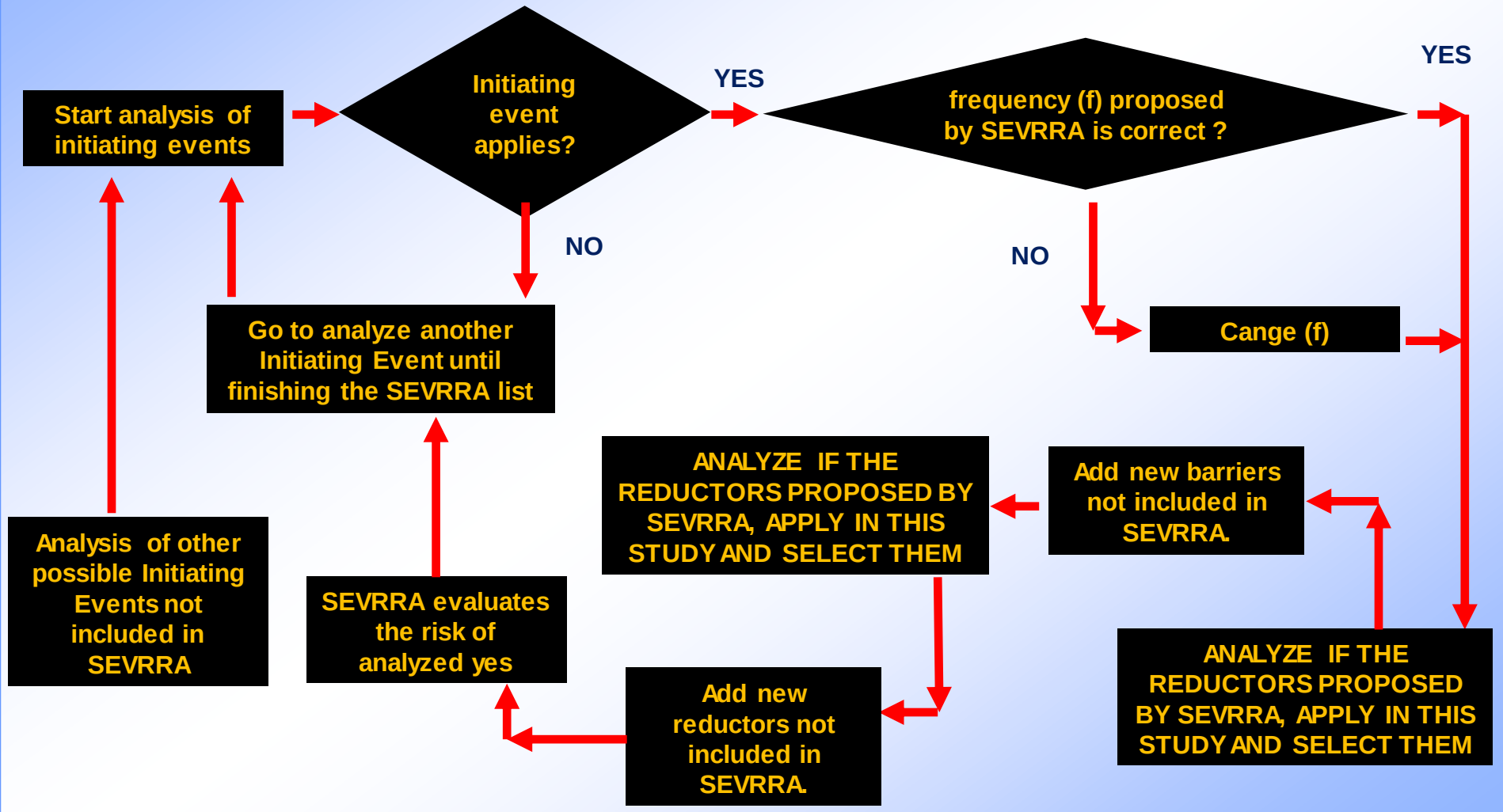
In order to apply the risk matrix method used by SEVRRA It is necessary to create a work team that includes the professionals of the radiotherapy service with vast experience and knowledge of their functions .

The team must include:

- **Radiotherapist**
- **Medical Physicist**
- **Dosimetrists**
- **Operator technician of the radiotherapy unit**
- **Electromedicine specialist**
- **Mold technician**
- **TAC and simulator operator**
- **Radiation protection officer**

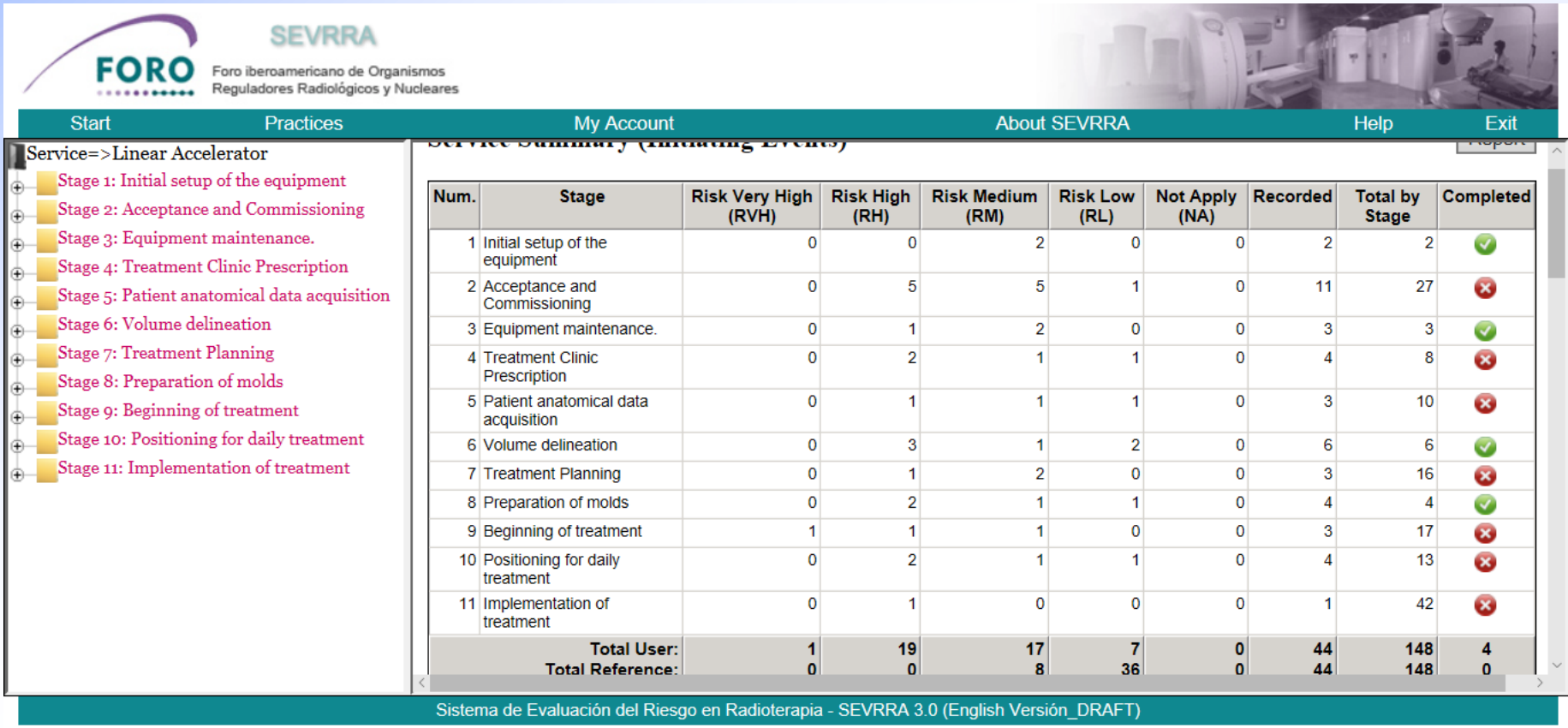


GENERAL CONDITIONS TO APPLY SEVRRA



HOW ARE IE ORGANIZED IN SEVRRA?

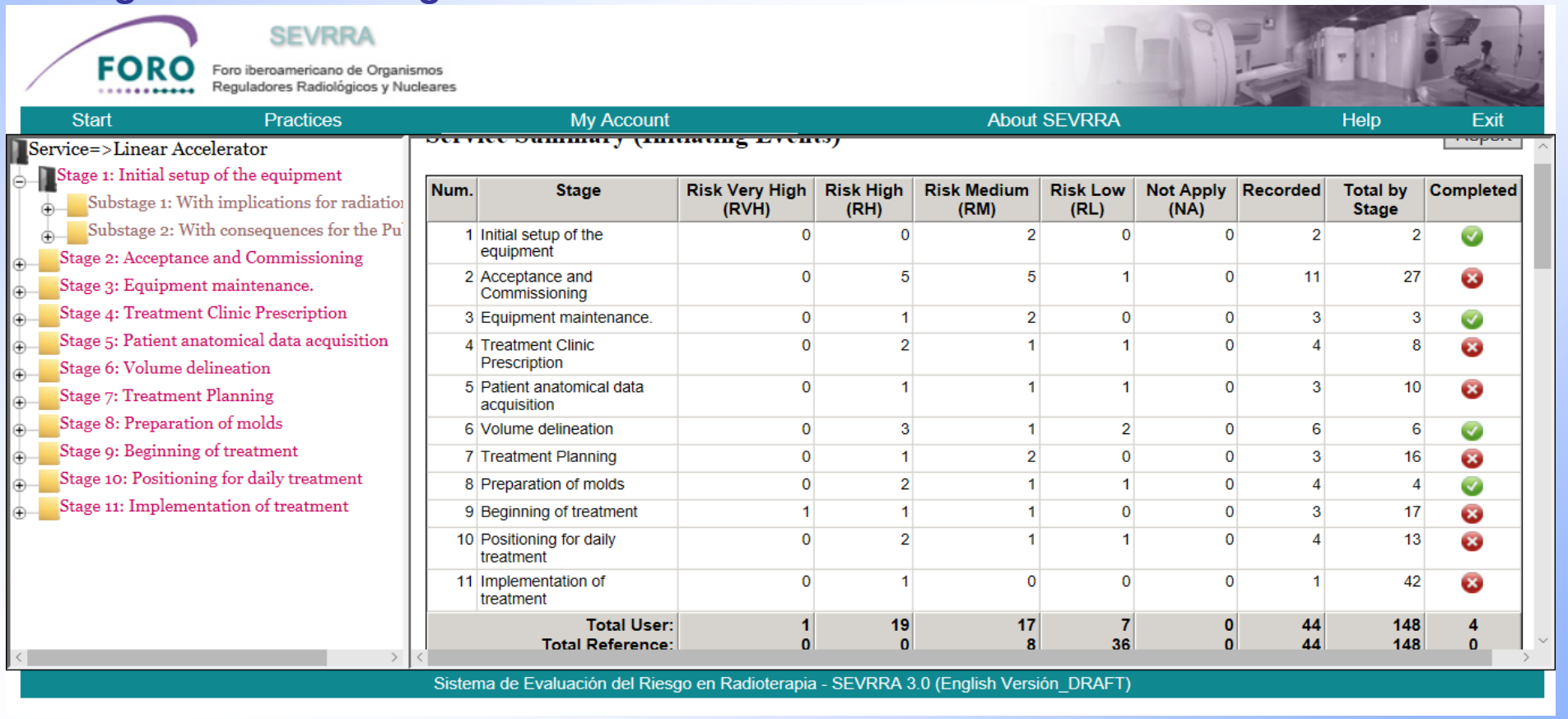
In SEVRRA, the initiating events found in the risk analysis, developed by FORO, are grouped in the different stages and sub-stages of the practices, and the navigation between them is similar to a Windows file



Num.	Stage	Risk Very High (RVH)	Risk High (RH)	Risk Medium (RM)	Risk Low (RL)	Not Apply (NA)	Recorded	Total by Stage	Completed
1	Initial setup of the equipment	0	0	2	0	0	2	2	✓
2	Acceptance and Commissioning	0	5	5	1	0	11	27	✗
3	Equipment maintenance.	0	1	2	0	0	3	3	✓
4	Treatment Clinic Prescription	0	2	1	1	0	4	8	✗
5	Patient anatomical data acquisition	0	1	1	1	0	3	10	✗
6	Volume delineation	0	3	1	2	0	6	6	✓
7	Treatment Planning	0	1	2	0	0	3	16	✗
8	Preparation of molds	0	2	1	1	0	4	4	✓
9	Beginning of treatment	1	1	1	0	0	3	17	✗
10	Positioning for daily treatment	0	2	1	1	0	4	13	✗
11	Implementation of treatment	0	1	0	0	0	1	42	✗
	Total User:	**1**	**19**	**17**	**7**	**0**	**44**	**148**	**4**
	Total Reference:	**0**	**0**	**8**	**36**	**0**	**44**	**148**	**0**

HOW ARE IE ORGANIZED IN SEVRRA?

In SEVRRA, the initiating events found in the risk analysis, developed by FORO, are grouped in the different stages and sub-stages of the practices, and the navigation between them is similar to a Windows file. **Example of navigation within the stages and sub-stages**



Num.	Stage	Risk Very High (RVH)	Risk High (RH)	Risk Medium (RM)	Risk Low (RL)	Not Apply (NA)	Recorded	Total by Stage	Completed
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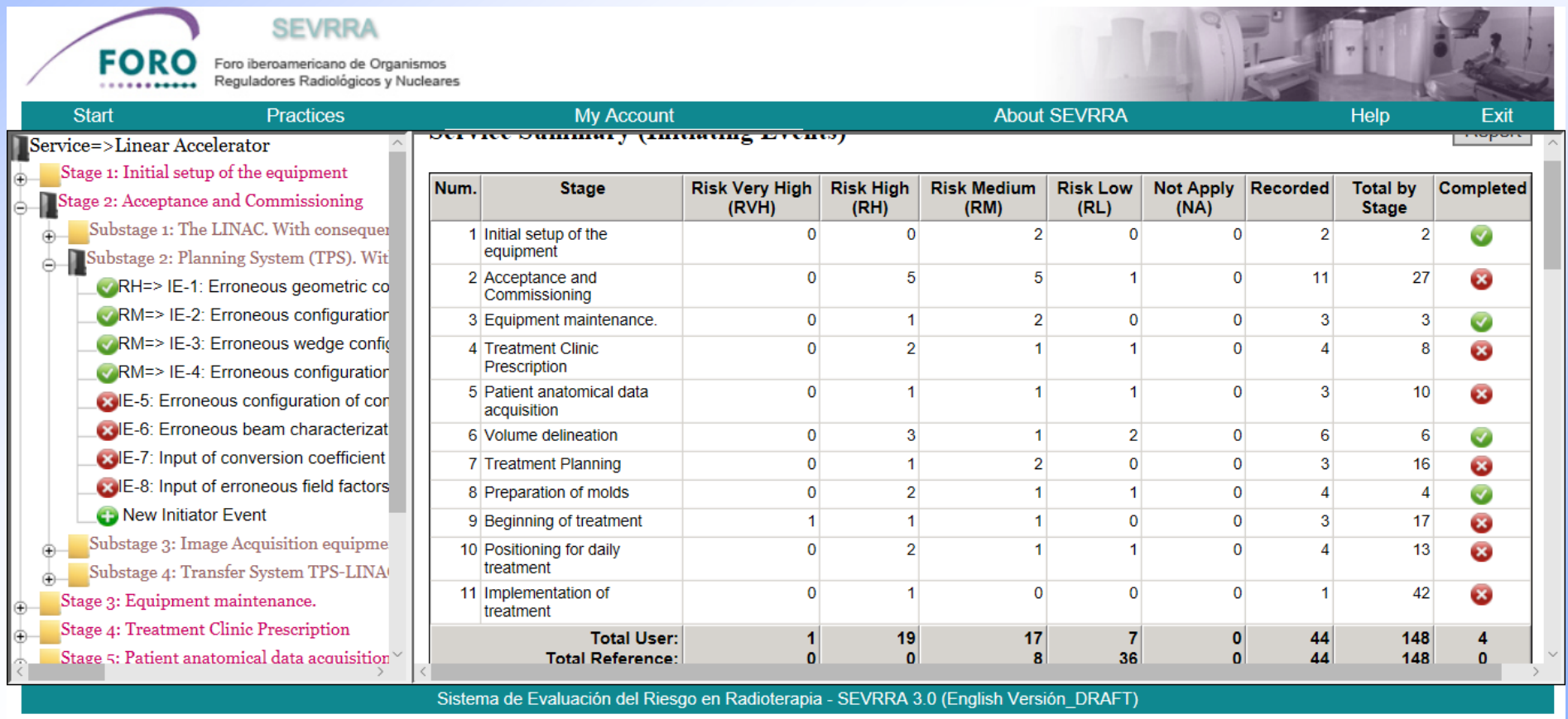
2	Acceptance and Commissioning	0	5	5	1	0	11	27	✗
3	Equipment maintenance.	0	1	2	0	0	3	3	✓
4	Treatment Clinic Prescription	0	2	1	1	0	4	8	✗
5	Patient anatomical data acquisition	0	1	1	1	0	3	10	✗
6	Volume delineation	0	3	1	2	0	6	6	✓
7	Treatment Planning	0	1	2	0	0	3	16	✗
8	Preparation of molds	0	2	1	1	0	4	4	✓
9	Beginning of treatment	1	1	1	0	0	3	17	✗
10	Positioning for daily treatment	0	2	1	1	0	4	13	✗
11	Implementation of treatment	0	1	0	0	0	1	42	✗
	Total User:	**1**	**19**	**17**	**7**	**0**	**44**	**148**	**4**
	Total Reference:	**0**	**0**	**8**	**36**	**0**	**44**	**148**	**0**

HOW ARE IE ORGANIZED IN SEVRRA?

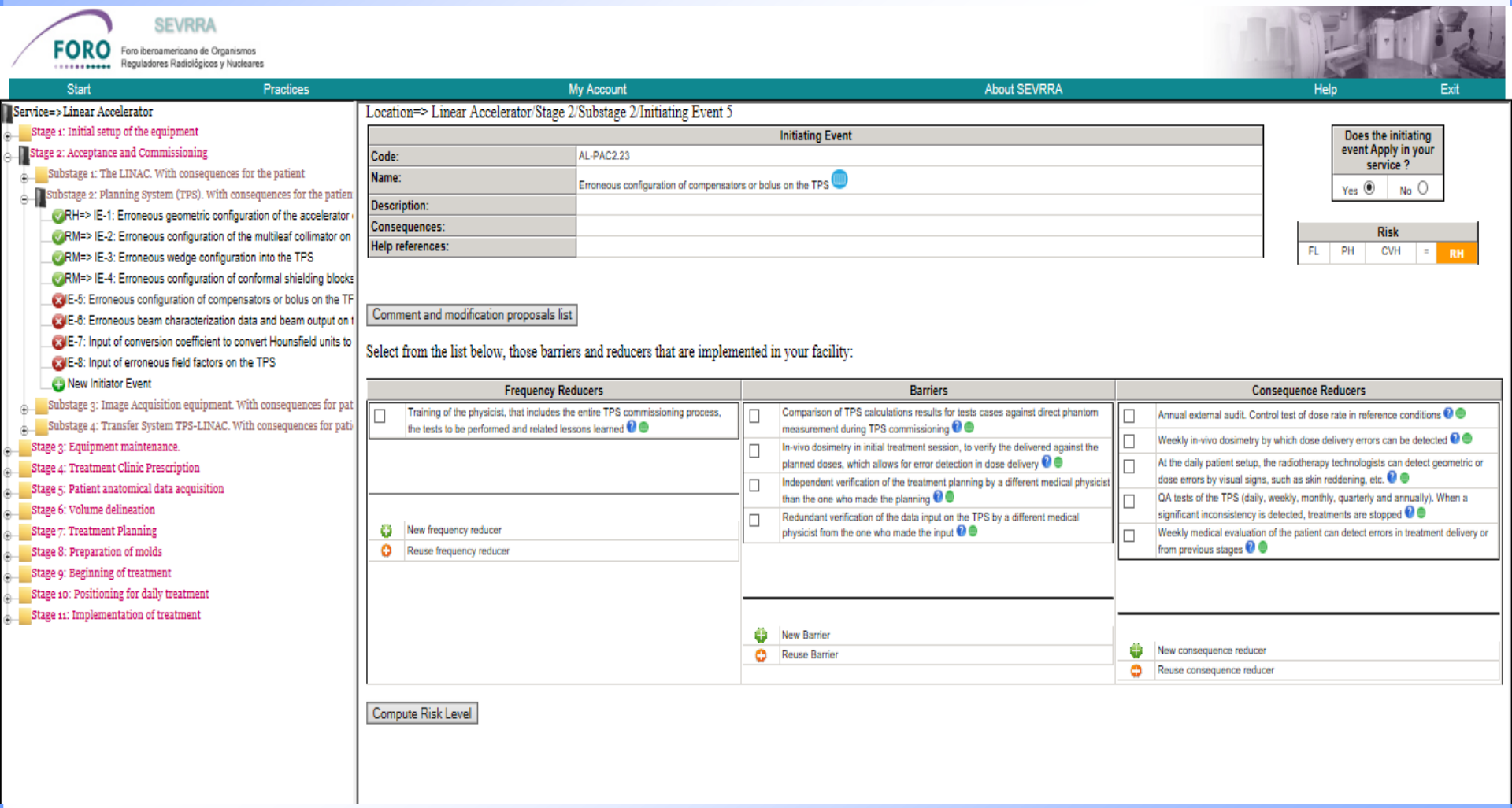
Example of navigation within the stages and sub-stages to analyze the different initiator events grouped in them.



Num.	Stage	Risk Very High (RVH)	Risk High (RH)	Risk Medium (RM)	Risk Low (RL)	Not Apply (NA)	Recorded	Total by Stage	Completed
1	Initial setup of the equipment	0	0	2	0	0	2	2	✓
2	Acceptance and Commissioning	0	5	5	1	0	11	27	✗
3	Equipment maintenance.	0	1	2	0	0	3	3	✓
4	Treatment Clinic Prescription	0	2	1	1	0	4	8	✗
5	Patient anatomical data acquisition	0	1	1	1	0	3	10	✗
6	Volume delineation	0	3	1	2	0	6	6	✓
7	Treatment Planning	0	1	2	0	0	3	16	✗
8	Preparation of molds	0	2	1	1	0	4	4	✓
9	Beginning of treatment	1	1	1	0	0	3	17	✗
10	Positioning for daily treatment	0	2	1	1	0	4	13	✗
11	Implementation of treatment	0	1	0	0	0	1	42	✗
	Total User:	**1**	**19**	**17**	**7**	**0**	**44**	**148**	**4**
	Total Reference:	**0**	**0**	**8**	**36**	**0**	**44**	**148**	**0**

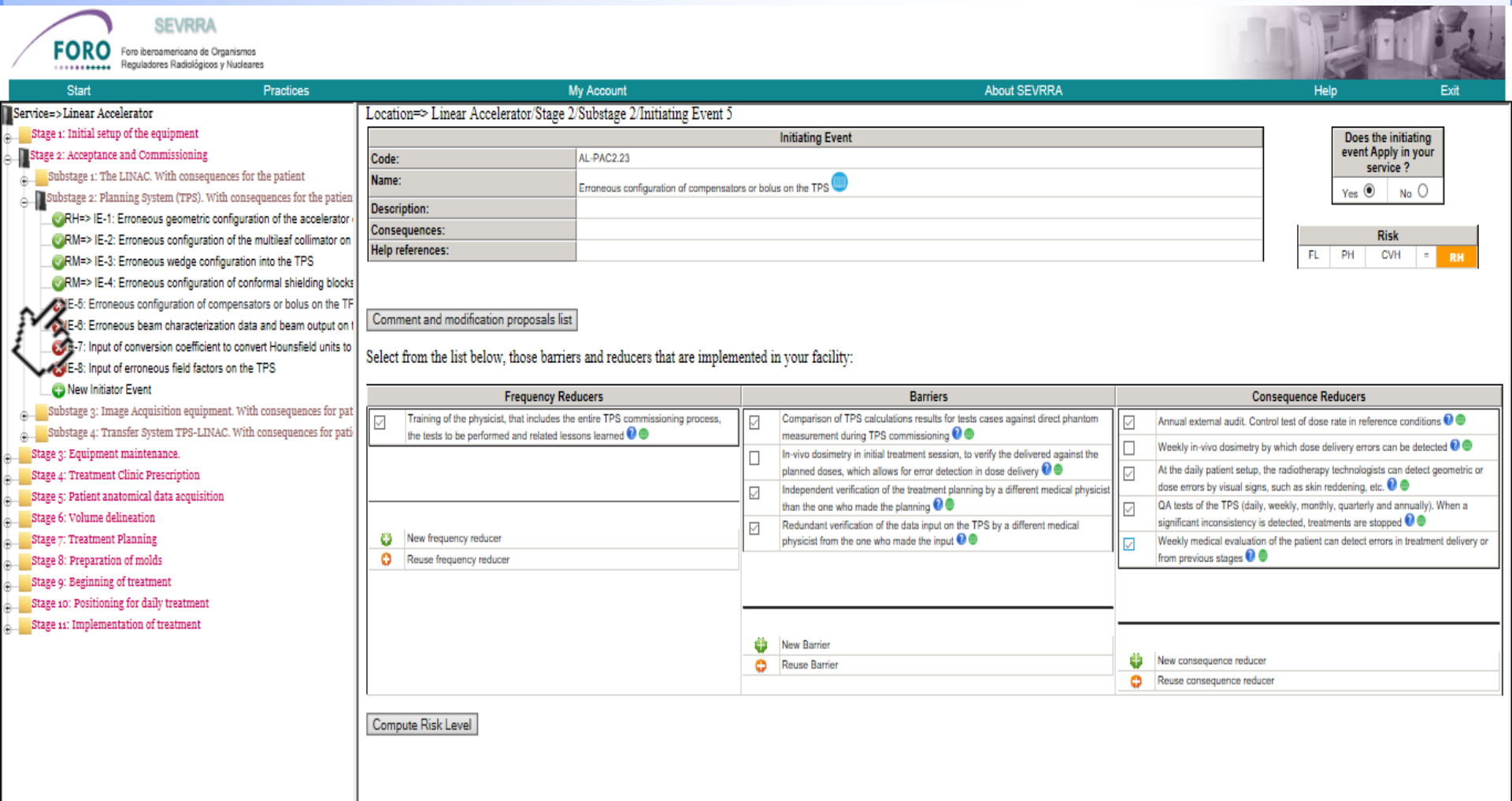
HOW ARE IE ORGANIZED IN SEVRRA?

Example of navigation within the stages and sub-stages to analyze a specific initiator event.



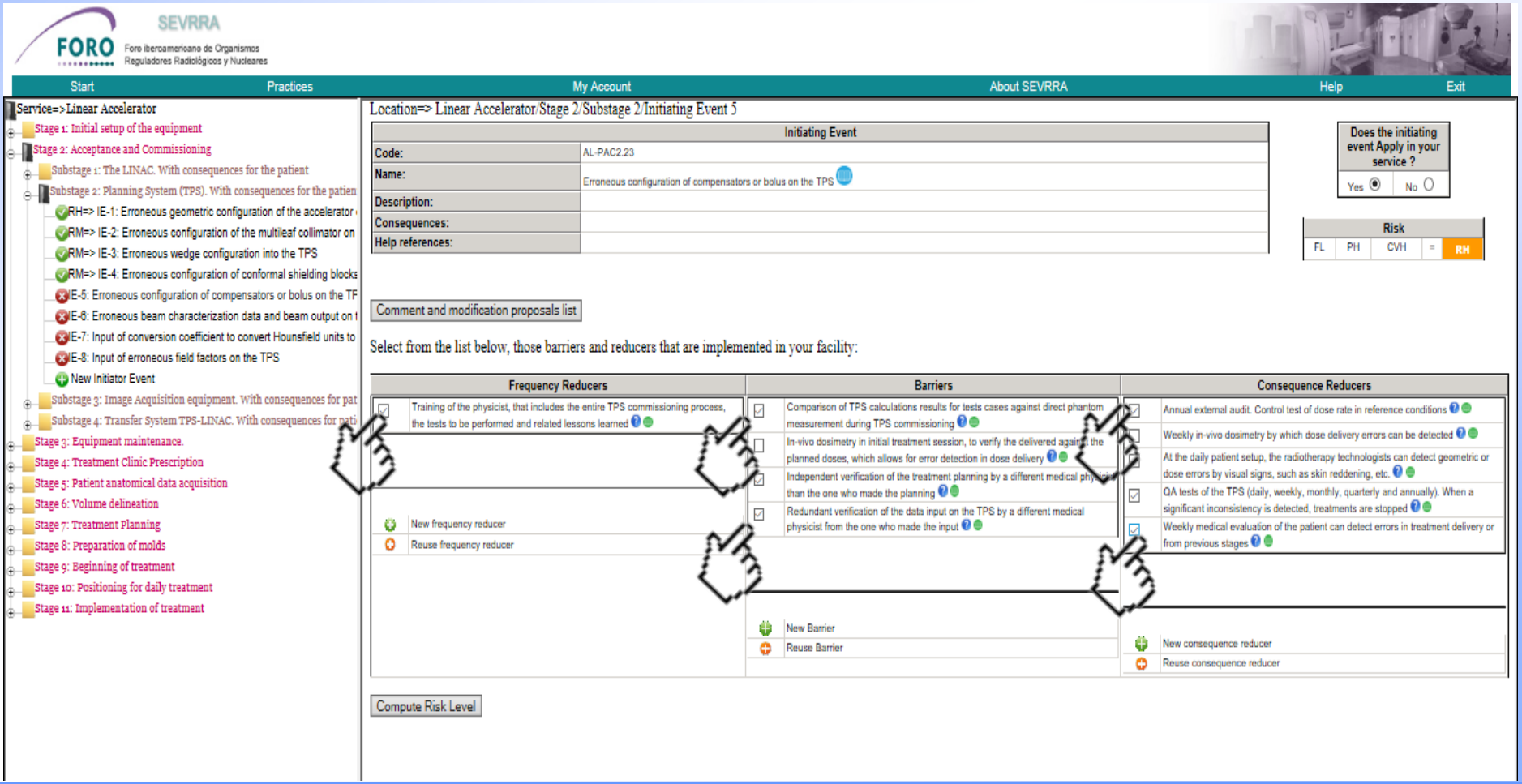
WHAT DO THE INITIATING EVENTS GROUP?

By analyzing each initiator event, the barriers, frequency reducers and reduction of consequences proposed by SEVRRA, can be evaluated to select those that are implemented in the radiotherapy service that we are analyzing.



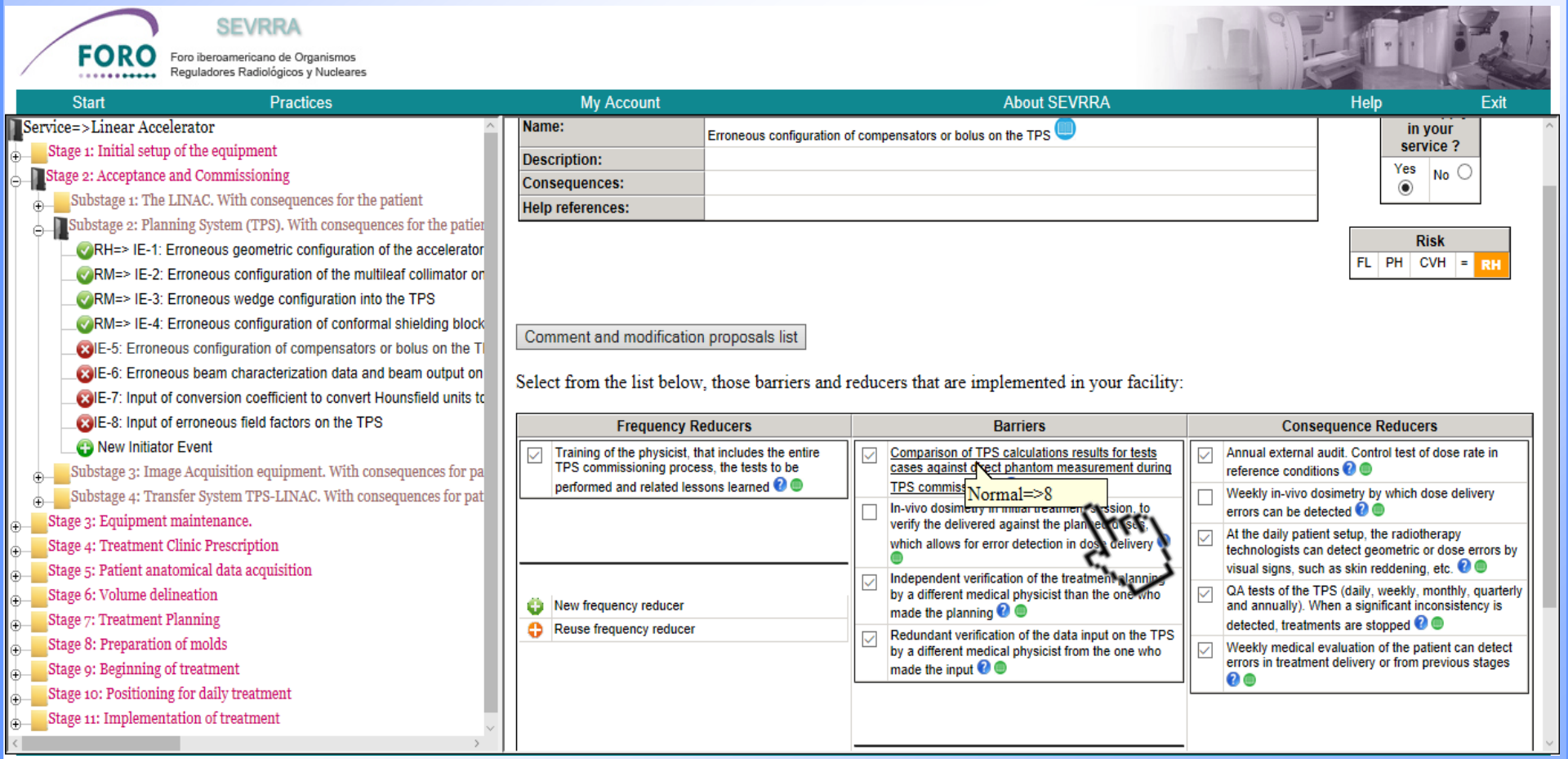
HOW IS RISK ANALYSIS PERFORMED?

Users, at this point, must read the situation or event that initiates the accident, question whether it is possible that this event can occur in their practice, and analyze between possible barriers, frequency reducers and consequences reducers which are those that are operative in their facility.



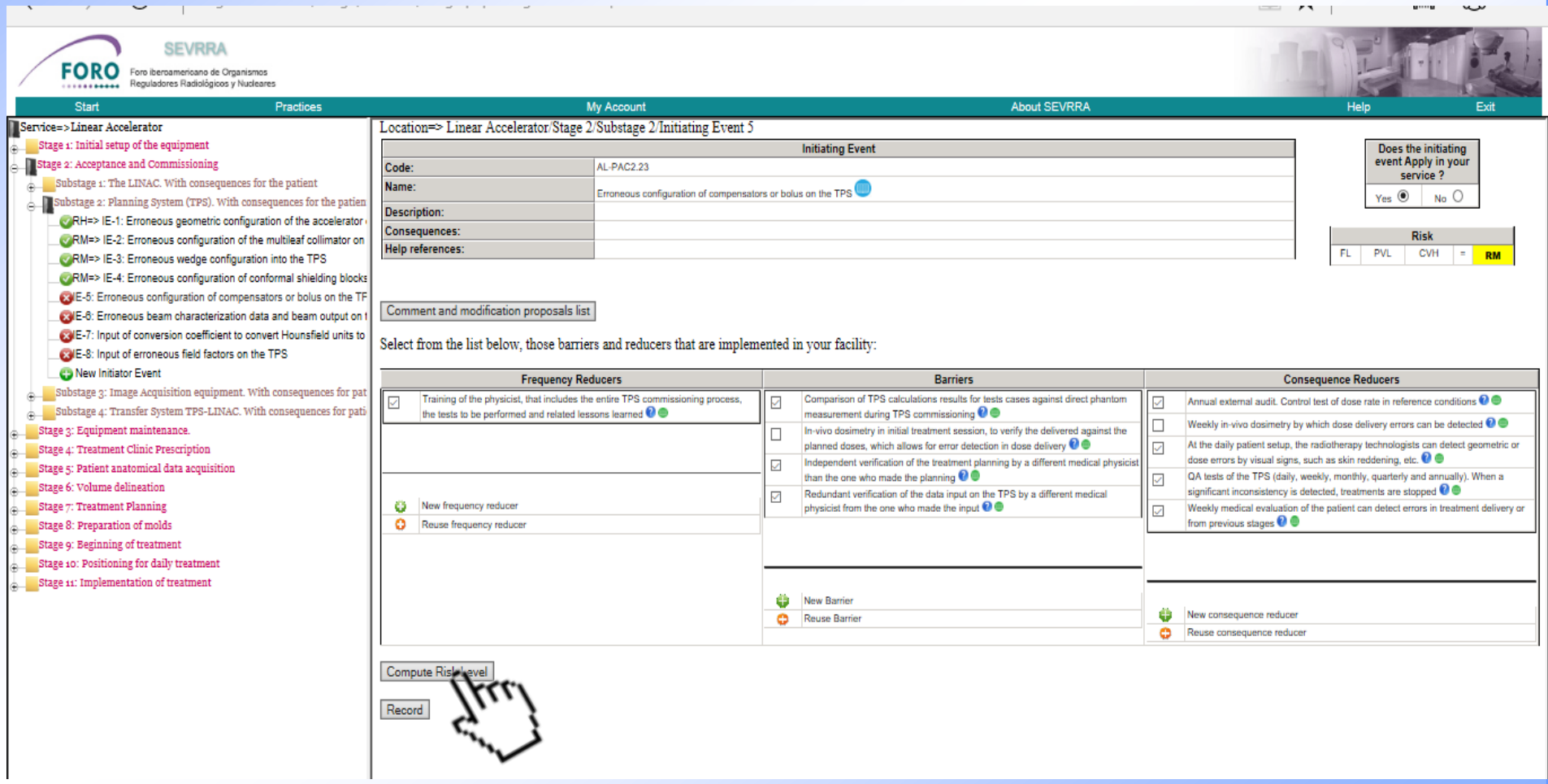
HOW ARE RISK LEVELS CALCULATED?

When selecting the barriers and reducers, SEVRRA assigns to each of them the corresponding weights (robustness) according to the criteria established in the methodology of the Risk Matrix. The calculation of Risk is done considering the multiplication of those weights



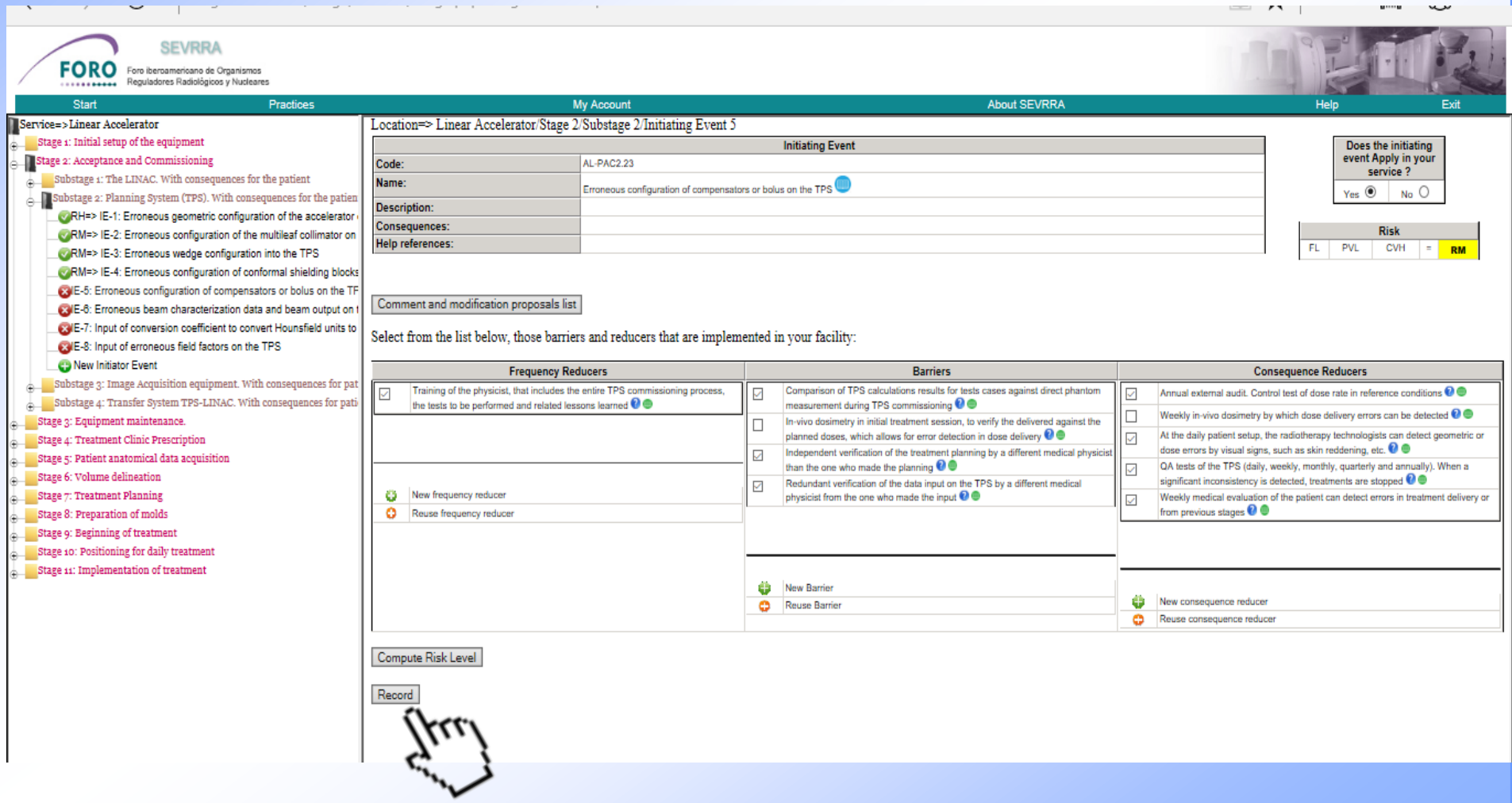
HOW ARE RISK LEVELS CALCULATED?

Once the existing barriers and reducers in the radiotherapy service are selected, the system can calculate the risk resulting from the initiating event by pressing the "calculate risk" button of the application.



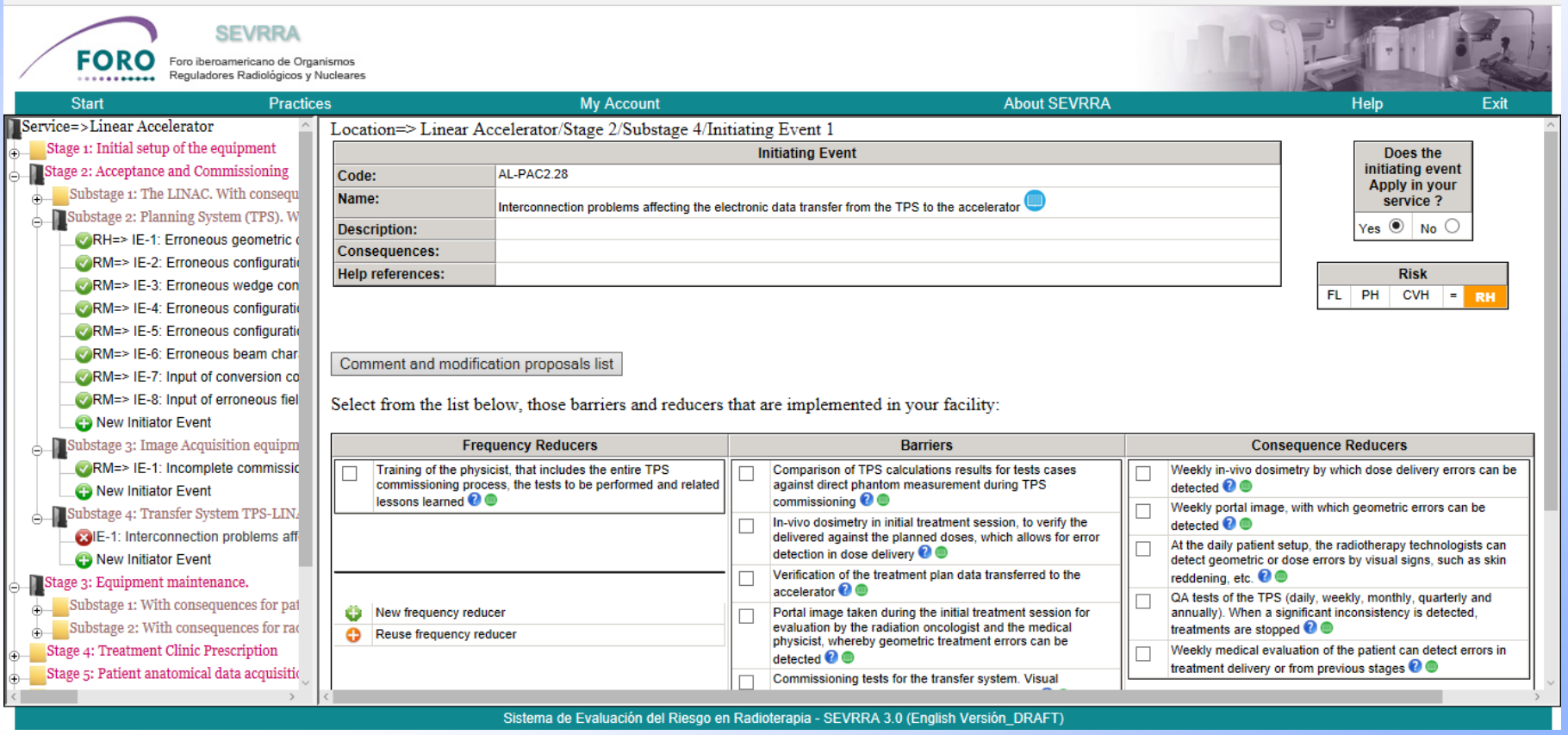
HOW ARE RISK LEVELS CALCULATED?

To register and save the evaluation progress, press the "Record" button of the application.



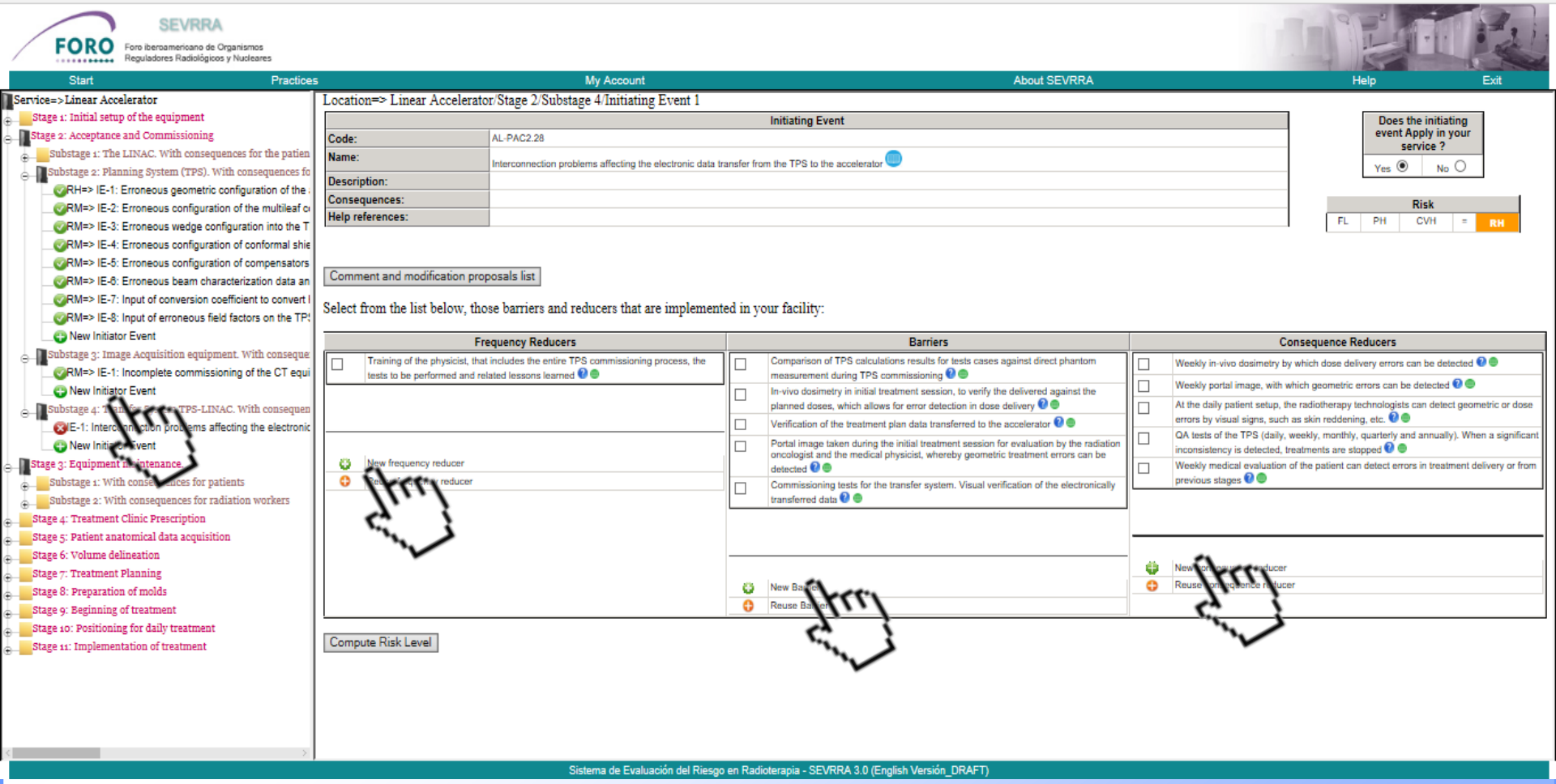
HOW ARE RISK LEVELS CALCULATED?

The analysis is repeated for each initiating event, until the practice is completed.



ADD BARRIERS AND REDUCERS

Users have the option to improve the analysis by adding barriers, reducers and initiating events.



FACILITY RISK PROFILE

As the analysis is completed, the risk profile of the facility will be outlined:

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Start | Practices | My Account | About SEVRRA | Help | Exit

Service=>Cobalt 60

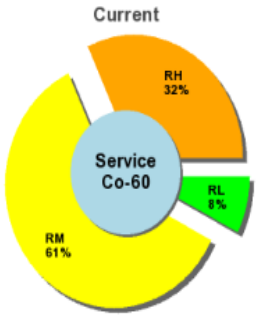
- Stage 1: Initial setup of the equipment
- Stage 2: Acceptance and Commissioning
- Stage 3: Equipment maintenance.
- Stage 4: Taking data from each patient for treatment planning
- Stage 5: Development of treatment plan
- Stage 6: Development of molds. Consequences for Patients wi
- Stage 7: Implementation of treatment

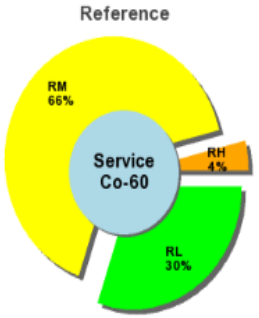
Service Summary (Initiating Events)

Report

Num.	Stage	Risk Very High (RVH)	Risk High (RH)	Risk Medium (RM)	Risk Low (RL)	Not Apply (NA)	Recorded	Total by Stage	Completed
1	Initial setup of the equipment	0	0	9	1	0	10	10	✓
2	Acceptance and Commissioning	0	4	20	0	0	24	24	✓
3	Equipment maintenance.	0	0	3	0	0	3	3	✓
4	Taking data from each patient for treatment planning	0	8	7	1	0	16	16	✓
5	Development of treatment plan	0	16	4	0	0	20	20	✓
6	Development of molds. Consequences for Patients with	0	0	3	0	0	3	3	✓
7	Implementation of treatment	0	14	34	8	0	56	56	✓
	Total User:	0	42	80	10	0	132	132	7
	Total Reference:	0	5	87	40	0	132	132	0

RISK COMPARISON:
Current Service vs. Reference Service





Sistema de Evaluación del Riesgo en Radioterapia - SEVRRA 3.0 (English Versión_DRAFT)

COMPARISON WITH REFERENCE FACILITY

Once completed, the user can see in a summary report the result of his analysis, comparing it with that of a reference facility

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3. Risk Assessment Results

3.1 Summary

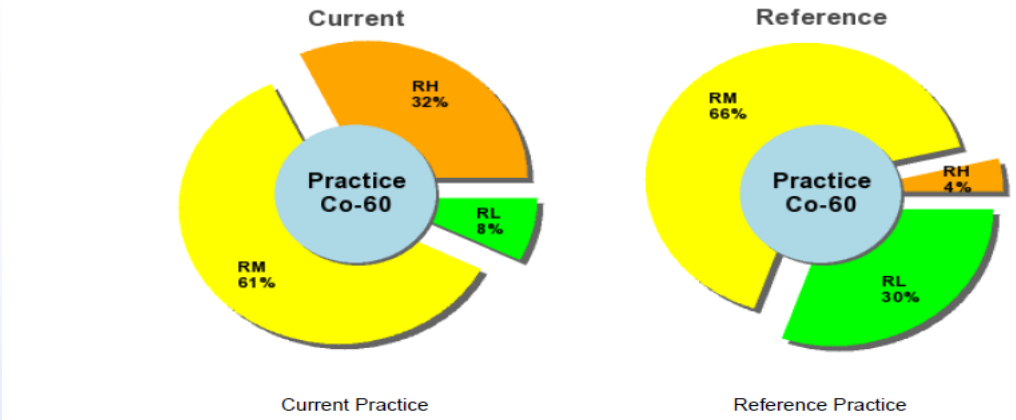
The risk assessment results indicate that taking into account existing safety barriers, frequency and consequences reducers in your Radiotherapy Service, the next risk levels has been reached for initiating events by stage:

Num.	Stage	Risk Very High (RMA)	Risk High (RA)	Risk Medium (RM)	Risk Low (RB)	No Apply (NA)	Analyzed	Total by stage	Complete
1	Initial setup of the equipment	0	0	9	1	0	10	10	✓
2	Acceptance and Commissioning	0	4	20	0	0	24	24	✓
3	Equipment maintenance.	0	0	3	0	0	3	3	✓
4	Taking data from each patient for treatment planning	0	8	7	1	0	16	16	✓
5	Development of treatment plan	0	16	4	0	0	20	20	✓
6	Development of molds. Consequences for Patients with	0	0	3	0	0	3	3	✓
7	Implementation of treatment	0	14	34	8	0	56	56	✓
	Total User: Total Reference:	0 0	42 5	80 87	10 40	0 0	132 132	132 132	7 0

Incorporated Sequences by User:

Núm.	Stage	Risk Very High (RMA)	Risk High (RA)	Risk Medium (RM)	Risk Low (RB)
1	Initial setup of the equipment	0	0	0	0
2	Acceptance and Commissioning	0	0	0	0
3	Equipment maintenance.	0	0	0	0
4	Taking data from each patient for treatment planning	0	0	0	0
5	Development of treatment plan	0	0	0	0
6	Development of molds. Consequences for Patients with	0	0	0	0
7	Implementation of treatment	0	0	0	0
	Total	0	0	0	0

3.2 Graphics: Current Practice vs. Reference Practice



FINAL REPORT

The system tells the user in a summary what are the barriers that are missing to the facility in order to reduce their risk level.

3.4 Accident sequences with high and very high risk

Risk Assessment results show that due to the lack of barriers or reducers, the next sequences have High Risk (RH) or Very High Risk (RVH):

IE Code	Initiating Event	Reference Risk	Calculated Risk	Missing Barriers and Reducers
Co60-PAC2.1	Error in the calibration coefficient of the ionization chamber and electrometer (in the standards dosimetry laboratory).	RM	RH	B-222: When performing commissioning tests, the air kerma rate is measured at 1m distance and compared with the value reported by the source manufacturer on the certificate. The measurement can be made in terms of absorbed dose to water and this value can be correlated with the air kerma values reported on the certificate CR-336: Annual external audit. Auditing procedure. Test for dose rate measurement at points around the irradiation head CR-377: At the weekly medical evaluation of the patient, errors in treatment delivery can be detected
Co60-PAC2.16	Error in recording data measured during commissioning, for input to the treatment planning system (TPS)	RM	RH	B-277: Redundant verification of the records by another medical physicist CR-357: Daily patient setup wherein the radiotherapy technologists can detect errors of geometry or dose by observing visual signs on the patient (skin reddening, etc.) CR-377: At the weekly medical evaluation of the patient, errors in treatment delivery can be detected
Co60-PAC2.17	Incorrect generation of data tables for manual treatment planning (for example, depth dose curves)	RH	RH	B-277: Redundant verification of the records by another medical physicist CR-339: Annual external audit. Review of the generated tables based on commissioning tests CR-377: At the weekly medical evaluation of the patient, errors in treatment delivery can be detected
Co60-PAC2.24	Incomplete commissioning of the CT equipment, leading to errors in the density and geometric scales	RL	RH	B-229: Portal image taken during initial treatment session for evaluation by the radiation oncologist and the medical physicist, by which geometric treatment errors can be detected CR-332: Annual external audit CR-350: Weekly portal image wherewith geometric errors can be detected CR-377: At the weekly medical evaluation of the patient, errors in treatment delivery can be detected

AID FOR EVENTS AND BARRIERS

The system is also enabled to include, in a future step, different formats of "aids" for a better understanding of the initiating events, and the ways of reducing the probability of occurrence.