



OntoWoH

*The OntoWoH Ontology - a Women's Health Reference
Ontology Detailing the Fragment of Climacteric and Menopause*

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Outline

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Introduction

03

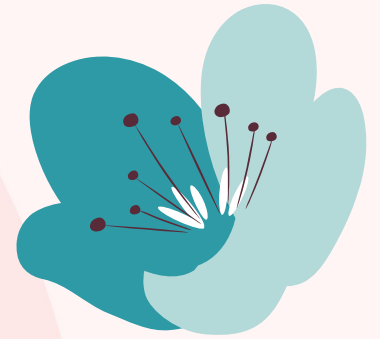
*Result: The Reference
Ontology for
Women's Health
(OntoWoH)*

02

*Theoretical Foundation and
Methodological Aspects*

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Conclusion



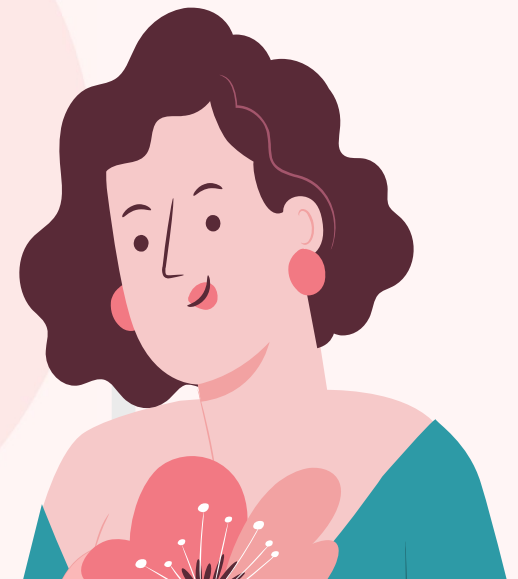
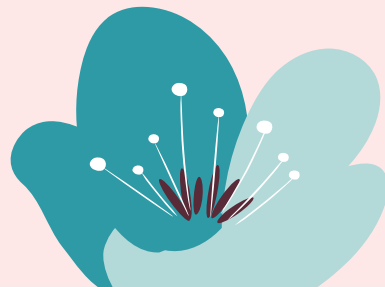


Introduction

- **What:** HealthCare Information System (HCIS) (future project). First step: conceptual model
- **Why:** To support decision-making in health care services
- **Some challenges:**
 - Knowledge understanding and sharing;
 - Communication flowing between agents (human and artificial);
 - Integration between databases of a HCIS network.
- Ontologies are one solution to solve such challenges. Among its benefits:
 - To establish a terminology;
 - To assist in the development of understandable, integrable, reusable, expandable knowledge bases.

Goal

The reference ontology named Ontology of Woman Health, OntoWoH, represents the complex and extensive domain of women's health, focusing on climacteric and menopause aspects in its version 1.0.



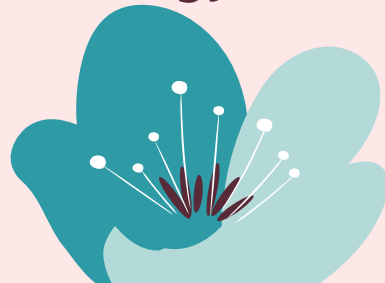
Theoretical Foundation and Methodological Aspects Phases of a Woman's Life



Theoretical Foundation and Methodological Aspects

The domain of women's health

- Phases of interest:
 - Reproductive stage.
 - Menstrual cycle;
 - Why menopause occurs;
 - Climacteric and menopause stage.
 - What are the existing terminology? Examples: Stages of Reproductive Aging Workshop (STRAW and STRAW+10);
 - Symptomatology and treatment of some problems.



Theoretical Foundation and Methodological Aspects

- Women are the majority of the Brazilian population and the main users of the Brazilian Public Health Care System;
- Due to the increase in women's life expectancy, the importance of studies focused on the phases of a woman's life from the climacteric and post menopause are highlighted;
- Personal motivation.



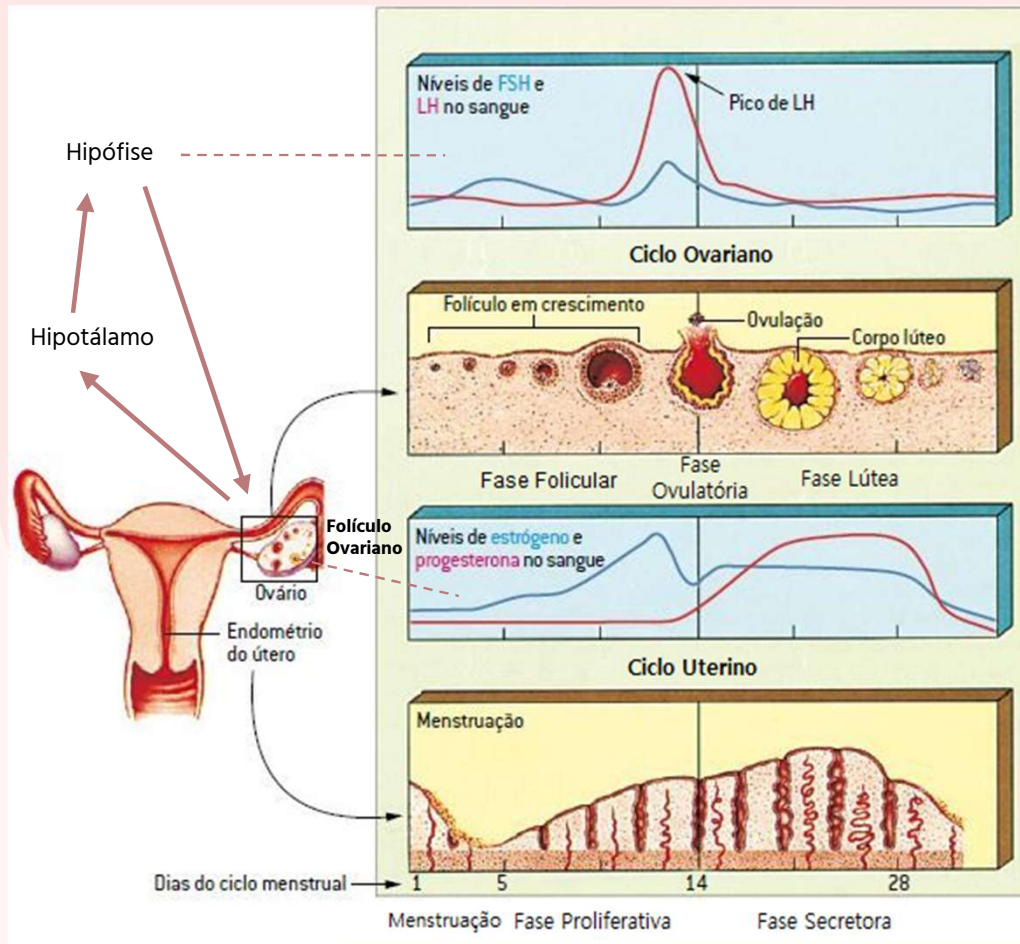
Women's Health



- Until the 1970s, actions related to women's health had a restricted view of women - their biological specificity and their social role as mothers and housewives, responsible for raising, educating and caring for their children and other family members health;
- Despite advances, there are still gaps in relation to women's health in Brazil, for example, to better understand and offer support to climacteric / menopause stage.



Menstrual Cycle



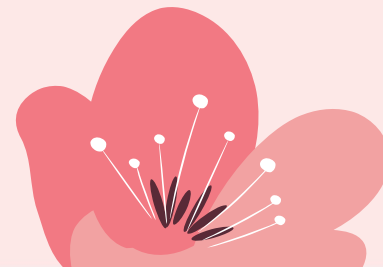
Source: Adapted from Bardine (2022). In Portuguese.

Understanding why menopause happens

- Decrease in the number of follicles in the ovaries;
- Progressive drop in estrogen, estradiol (E2) and progesterone concentrations in the woman's body;
- The ovaries begin to respond less to the stimulation of Follicle-Stimulating (FSH) and Luteinizing (LH) hormones.

Climacteric and Menopause

The climacteric is a biological phase of a woman's life, and not a pathological process, comprising the transition between the reproductive and non-reproductive periods of a woman's life. Menopause is a milestone of this phase and corresponds to the last menstrual cycle, being recognized as so only after twelve months of its occurrence (BRASIL, 2008).



Terminology STRAW + 10 (2011)

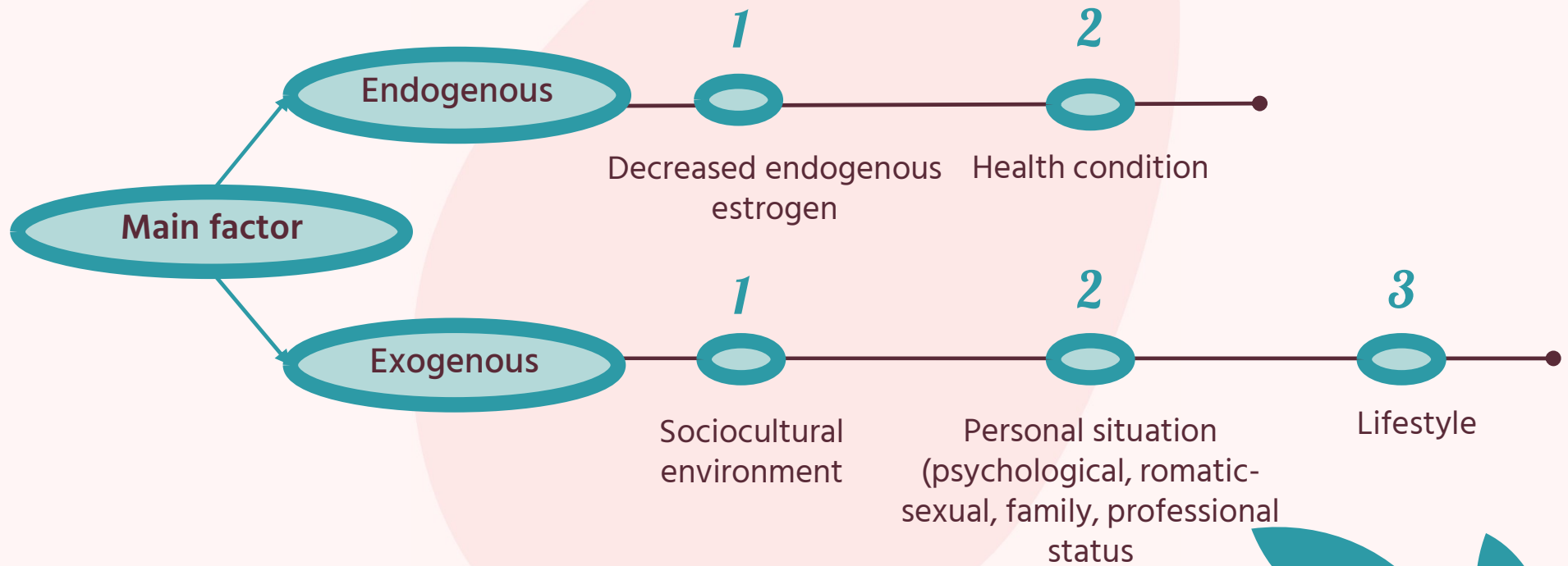
	Menarche											FMP (0)	
Stage	-5	-4	-3b	-3a	-2	-1	+1 a	+1b	+1c	+2			
Terminology	REPRODUCTIVE				MENOPAUSAL TRANSITION		POSTMENOPAUSE						
	Early	Peak	Late		Early	Late	Early		Late				
					<i>Perimenopause</i>								
Duration	<i>variable</i>				<i>variable</i>	1-3 years	2 years (1+1)	3-6 years	<i>Remaining lifespan</i>				
PRINCIPAL CRITERIA													
Menstrual Cycle	Variable to regular	Regular	Regular	Subtle changes in Flow/ Length	<i>Variable Length</i> Persistent ≥7- day difference in length of consecutive cycles	Interval of amenorrhea of ≥60 days							
SUPPORTIVE CRITERIA													
<i>Endocrine</i> FSH AMH Inhibin B			Low Low	Variable* Low Low	↑ Variable* Low Low	↑ >25 IU/L** Low Low	↑ Variable Low Low	Stabilizes Very Low Very Low					
<i>Antral Follicle Count</i>			Low	Low	Low	Low	Very Low	Very Low					
DESCRIPTIVE CHARACTERISTICS													
Symptoms						Vasomotor symptoms <i>Likely</i>	Vasomotor symptoms <i>Most Likely</i>				<i>Increasing symptoms of urogenital atrophy</i>		

* Blood draw on cycle days 2-5 ↑ = elevated

**Approximate expected level based on assays using current international pituitary standard⁶⁷⁻⁶⁹

Source: Harlow et al. (2012).

Climacteric Syndrome Symptomatology



Climacteric Syndrome Treatment

- Pharmacological approach.
 - Hormone therapy;
 - Non-hormonal therapy;
- Non-pharmacological approach.

Ontology & Ontology Engineering



- An ontology is a formal representation of relevant concepts and relationships of a system, which allows sharing and reuse of acquired and represented knowledge (Guarino, Oberle, Staab, 2009);
- The Ontology Engineering field seeks to improve the development of ontologies, as it enables the identification and development of a common standard that can be used in the construction of several ontologies, through the establishment of processes, techniques, guidelines and tools that can be applied to fulfill this goal.



Ontology Classification

Where OntoWoH is?

Regarding Aspects

Reference Ontology
(conceptual
expressiveness)



Operational Ontology
(computational
efficiency)

Regarding Abstraction Levels

Foundational
Ontology
(generic)

Core Ontology
(intermediate)

Domain Ontology
(specific)

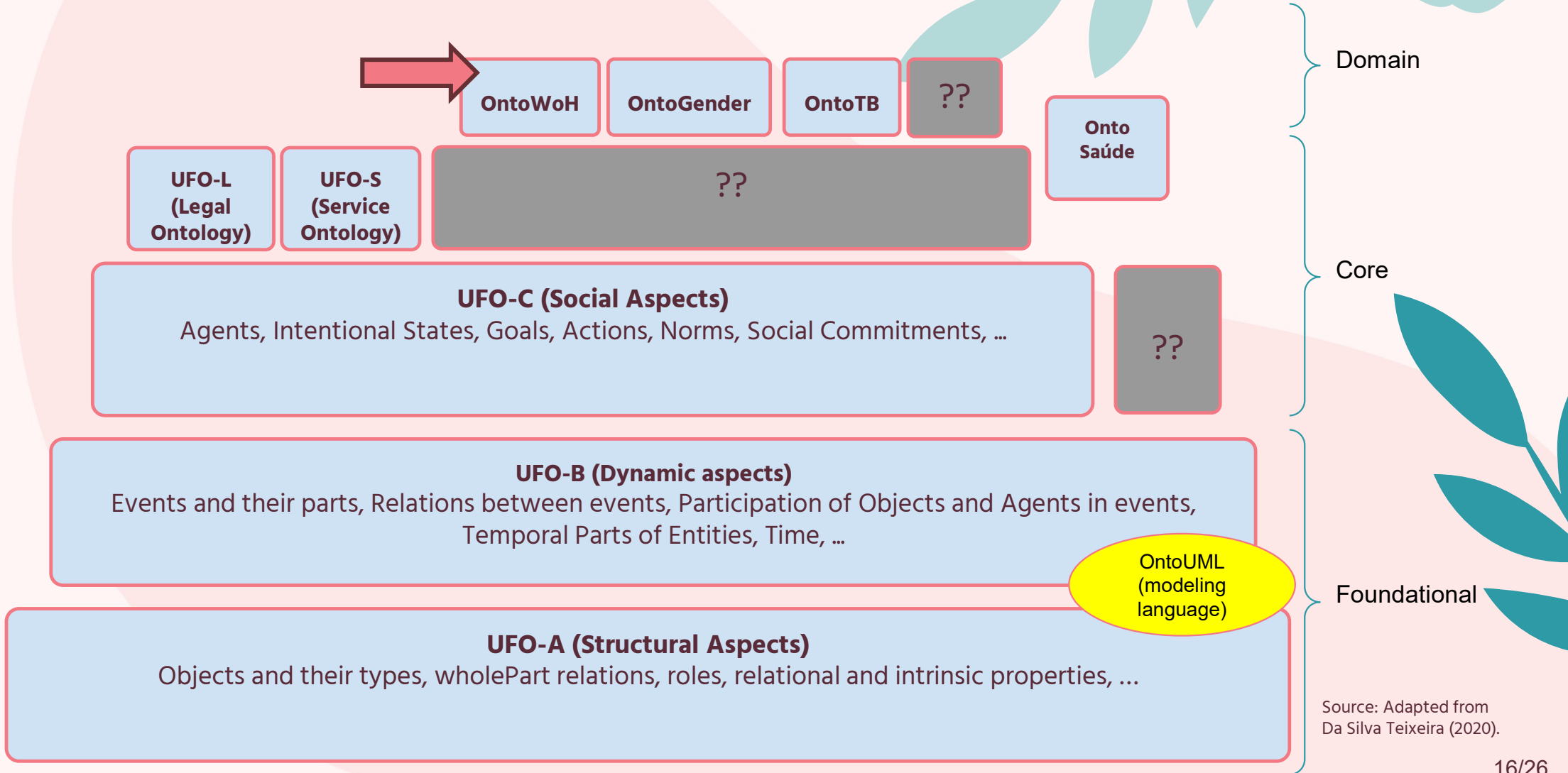


UFO

OntoWoH

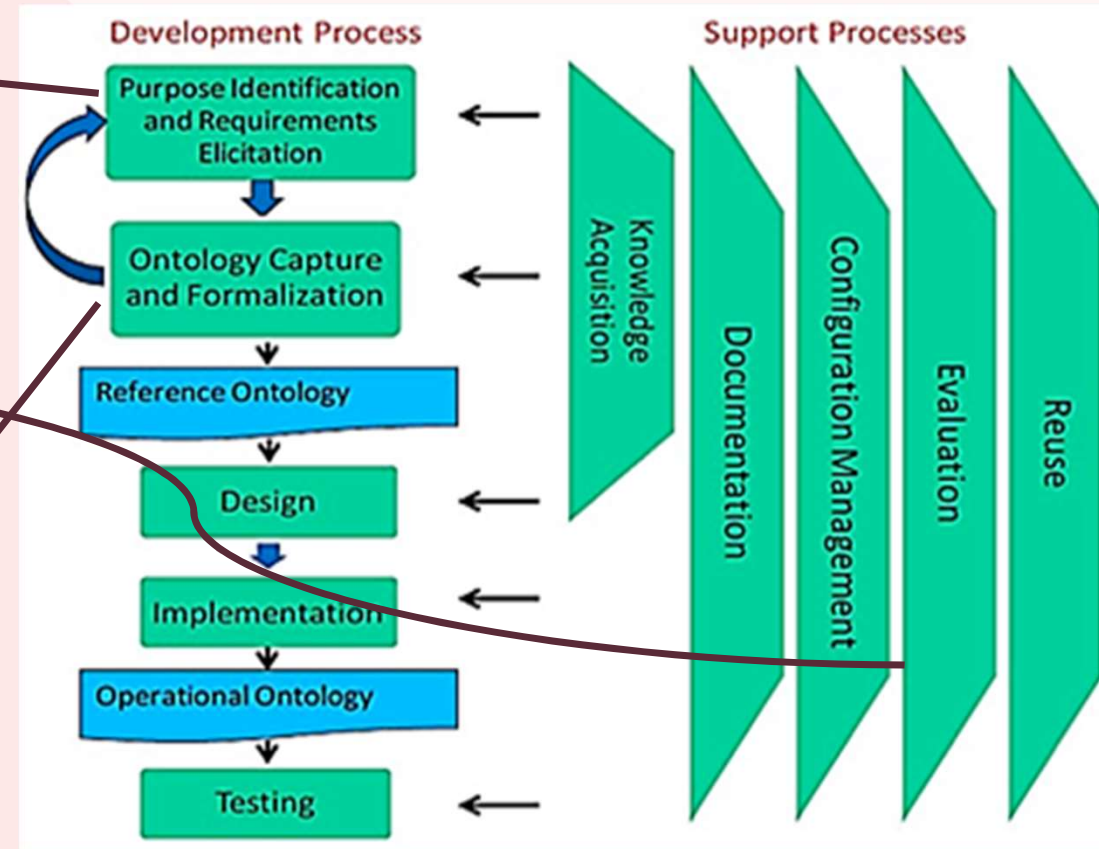
Source: Adapted from Da Silva Teixeira (2020).

Unified Foundational Ontology (UFO) and Where OntoWoH is?



OntoWoH Development Process SABiO Approach

- Purpose and Possible Uses of OntoWoH;
- Competency questions;
- General Aspects
 - Quality control:
 - Modeling decisions;
 - Verification;
 - Validation.
- Graphical representation (diagrams);
- Textual description;
- Glossary of terms.

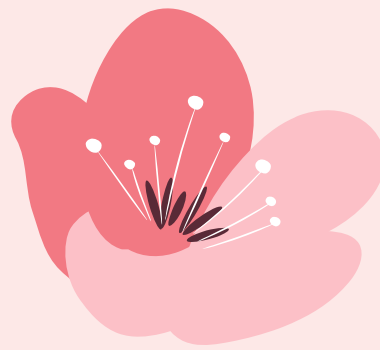


Source: Falbo (2014).

OntoWoH's Competency Questions (CQ)

Some Examples

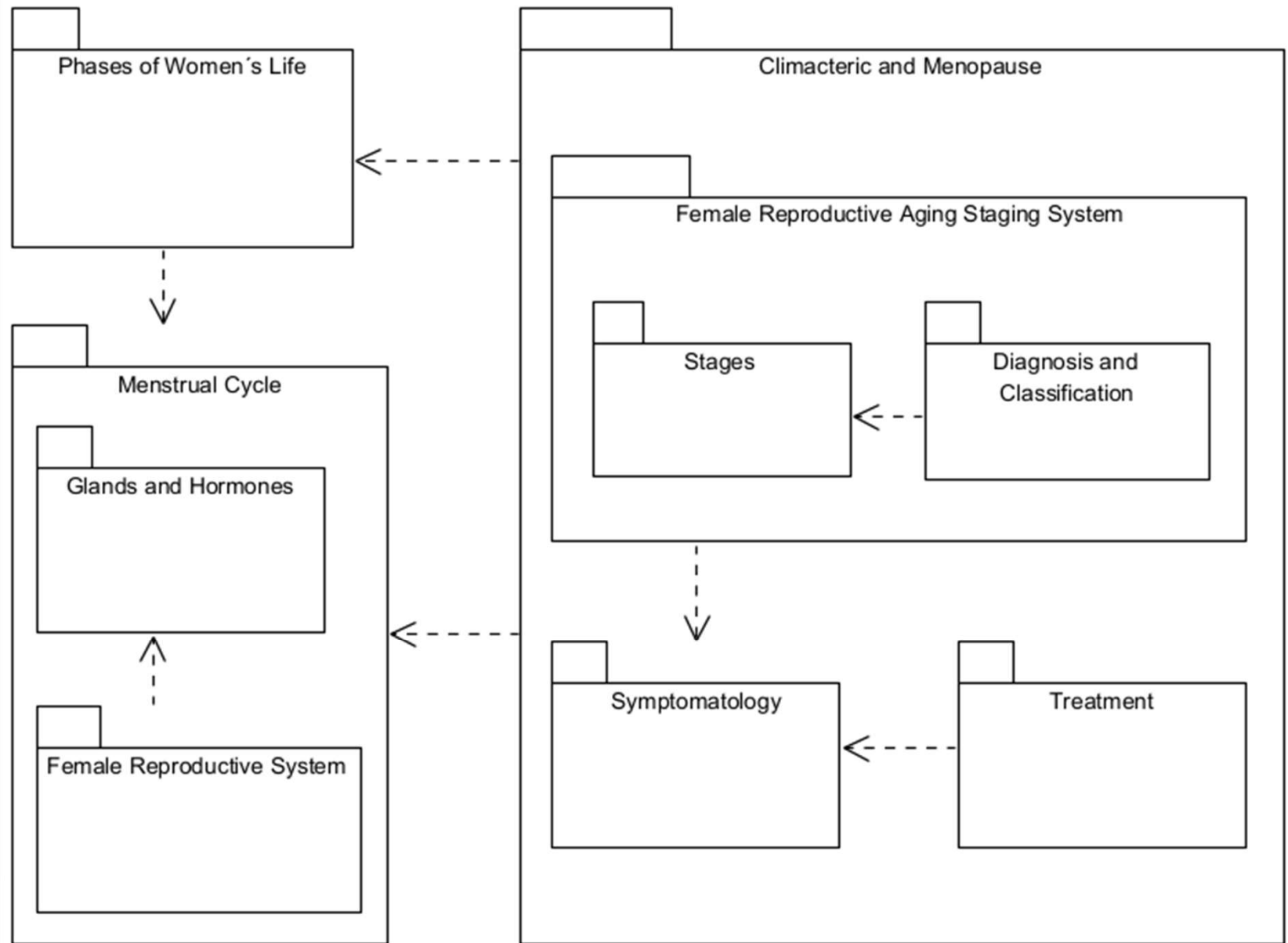
- CQ1: What are the particularly feminine events and at what stages of a woman's life can such events occur?
- CQ2: Which stages of women's reproductive aging are considered in STRAW + 10?

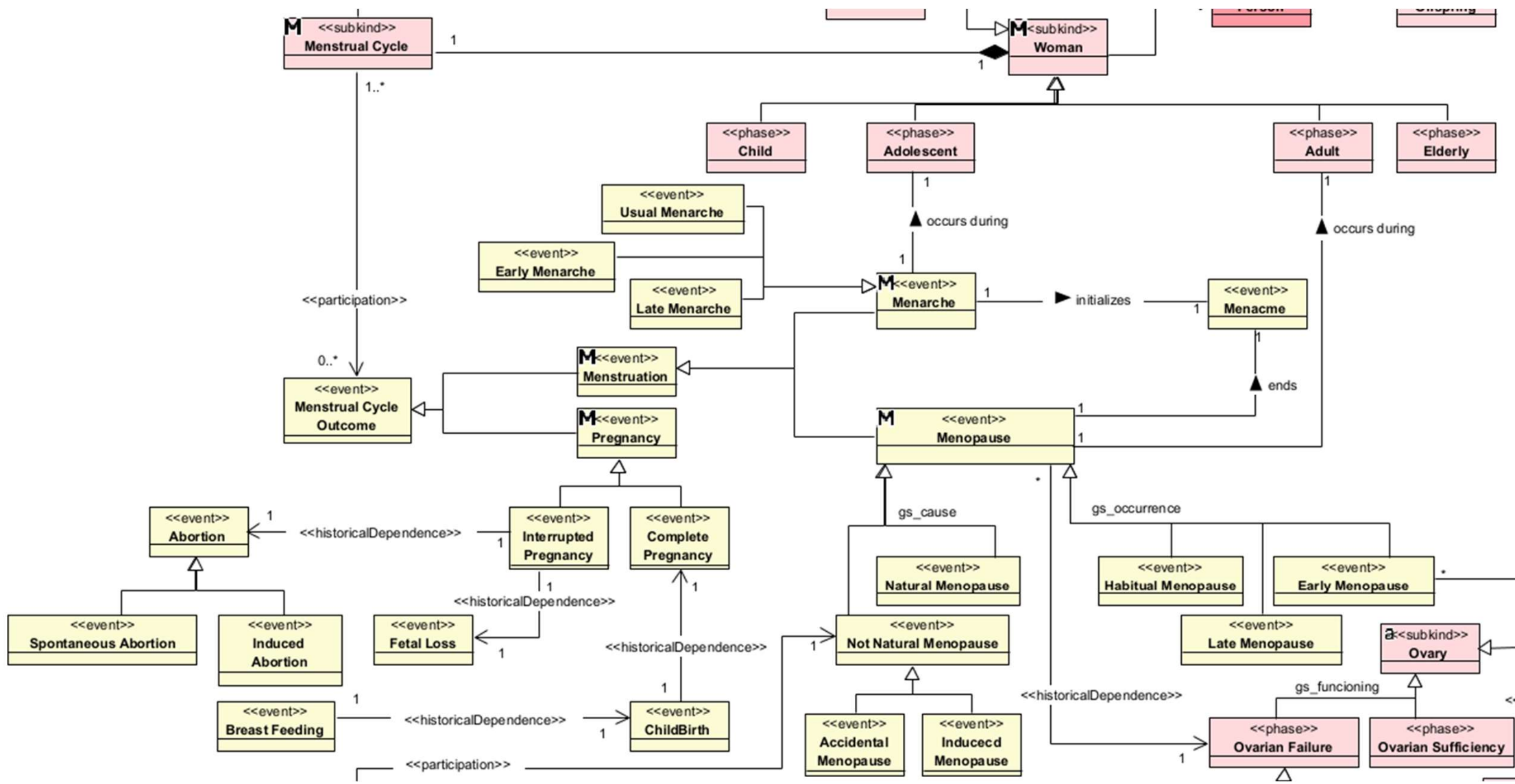


Result: OntoWoH's Graphical Representation

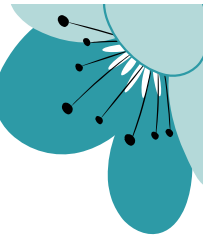
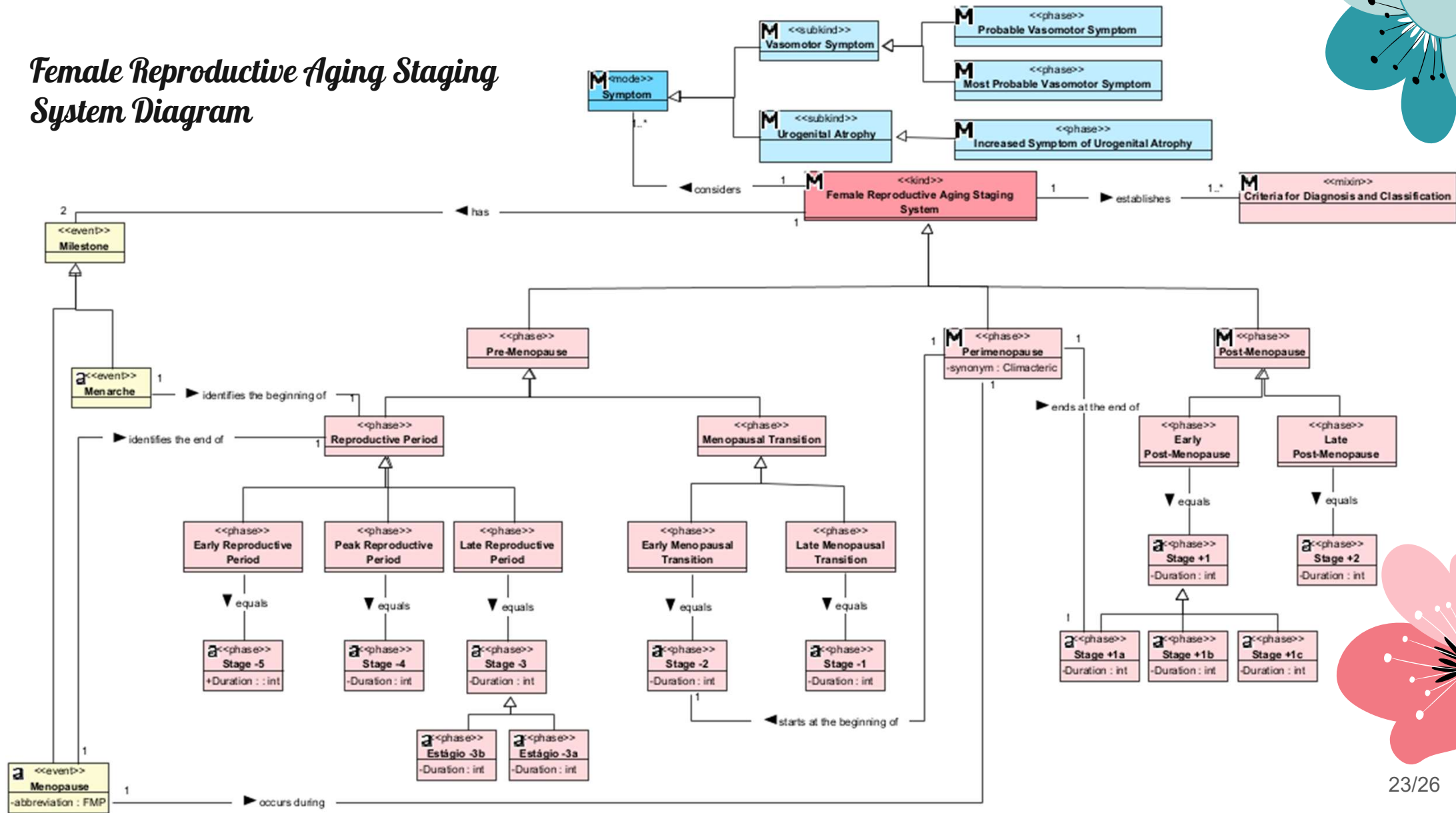
- OntoWoH overview diagram;
- Some OntoWoh detailed diagrams.

OntoWoH Overview





Female Reproductive Aging Staging System Diagram



Conclusion

- The product;
- Were the proposed goals achieved?
- Lessons learned;
- Next chapters:
 - OWL;
 - OBO Foundry;
 - Reuse;
 - Expansion;
 - ...

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Thanks!

Let's discuss it!!!

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