**THE SDA* MODEL V1.0:** Clinical Algorithms are schematic models of the clinical decision pathways described in a clinical practice guideline or in a part of it. The SDA* Model is a framework that extends the representation of Clinical Algorithms with states, non-determinism, time constraints, and indications on the performers.

SDA* Algorithms are flowcharts that combine patient states and professional decisions and actions. States define the sort of patient conditions that define a feasible starting point of the treatment. Decisions are conditions that may derive the treatment in one direction or another. Actions represent the activities of the actors participating in the treatment (i.e., professionals, patients, relatives, etc.).

In a SDA* Algorithm, states are represented as red circles, decisions as yellow diamonds, and actions as blue boxes, which are mutually connected with arrows. Arrows may contain temporal delays that affect the treatment, and they may define loops.

Arrows going out of decisions contain the condition that derives the treatment in the direction of the arrow. The treatment starts in one of the states and follows a path through the arrows that are satisfied till a temporal minimal delay is found or a state is reached that is not satisfied by the patient.

Medical non-deterministic situations and actions may be represented in the SDA* Algorithm and they are solved at the time of using the SDA* Algorithm. Individual actions in the action boxes can be related to one or several **petitioners** (sorts of actors that is allowed to order the action) or **performers** (sorts of actors that are allowed to apply the action).

**SDA* EDITOR:** The K4CARE Platform incorporates a graphical interface editor to create, incorporate, view, and modify SDA* Algorithms. These algorithms represent K4CARE FIPs and they are informational elements to guide health care professionals in the determination of the best treatment of a particular patient.

**FORMAL INTERVENTION PLANS:** K4CARE provides a family of Formal Intervention Plans for all the syndromes, diseases, and social issues available. These algorithms represent K4CARE FIPs and they are informational elements to guide health care professionals in the determination of the best treatment of a particular patient.

**DISEASES:** In home care, diseases are physiological or psychological dysfunctions. The K4CARE project provides support to the treatment of fifteen diseases and six sorts of dementia.

**A. SYNDROMES**
- SY1.0 Cognitive Impairment
- SY2.0 Immobility

**B. DISEASES**
- DI01.0 Anemia
- DI02.0 Arthritis
- DI03.0 Cerebrovascular diseases
- DI04.0 Chronic ischaemic heart disease
- DI05.0 Chronic Obstructive Pulmonary Disease
- DI06.0 Decubitus ulcer
- DI07.0 Delirium
- DI08.0 Dementia
- DI08.1 Alzheimer type Dementia
- DI08.2 Vascular Type Dementia
- DI08.3 Mixed Type Dementia
- DI08.4 Other degenerative Dementia
- DI08.5 Secondary Dementia
- DI08.6 Unspecified Dementia
- DI09.0 Depression
- DI10.0 Diabetes
- DI11.0 Heart failure
- DI12.0 Hypertension
- DI13.0 Iatrogenic cognitive impairment
- DI14.0 Parkinson disease
- DI15.0 Other disease

**C. SOCIAL ISSUES**
- SI01 No Family support
- SI02 Low Income
- SI03 No Social-network
- SI04 Bad Environment
- SI05 Insanity

There are several international classifications of diseases, among which K4CARE uses the "International Classification of Diseases, Injuries and Causes of Death, 10th revision Clinical Modification" (ICD-10-CM) to codify and also to structure the diseases that are related to the HC syndromes.

**SOCIAL ISSUES:** Social issues are matters that can be explained only by factors outside an individual's control and immediate social environment which affect many individuals in a society. In K4CARE we consider principal social issues that involve elder which are assisted at home.

**INDIVIDUAL INTERVENTION PLANS:** At any time after a multi-dimensional assessment, all the patients of the K4CARE model have an active Individual Intervention Plan (IIP) attached that is decided by the professionals participating in the Evaluation Unit of the patient. The IIP of a patient may be changed each time the patient is re-evaluated.
An IIP is the result of merging, adapting, and learning FIPs.

**Merging** is defined as the process of combining several FIPs that affect one patient in order to provide a single treatment for that patient (e.g., treatment of comorbidities).

**Adapting** is the process by which some parts of a FIP are identified as irrelevant for the target patient due to the particularities of that patient (e.g., antecedents in the Health Care Record).

**Learning** is the process by which the health care records of the patients that are similar to the target patient are recovered from the K4CARE Electronic Health Care Record, and the data on their treatments used to induce a FIP that summarizes the treatment followed for similar patients in the past.

FIPs on Anemia
- Recognition, Assessment, Treatment, and Monitoring Management in the Elderly

FIPs on Arthritis
- Treatment of Osteoarthritis

FIPs on Cognitive Impairment
- Treatment

FIPs on Coronary Heart Disease
- Treatment

FIPs on Chronic Obstructive Pulmonary Disease
- Pharmacological Treatment
- Astute Exacerbation Treatment

FIPs on Delirium
- Treatment

FIPs on Depression
- Pharmacological Treatment
- Depression with Cognitive Impairment Treatment
- Depression with Dementia Treatment
- Suicide Risk Assessment

FIPs on Heart Failure
- Chronic Heart Failure Treatment
- Chronic Heart Failure Monitoring

FIPs on Hypertension
- Initial Hypertension Treatment
- Treatment (Stage I)
- Treatment (Stage II)

FIPs on Immobility
- Assessment
- Patient Bedridden Treatment
- Bowel Dysfunction Treatment
- Bladder Dysfunction Treatment
- Pain Treatment

FIPs on Parkinson’s Disease and Parkinsonism
- Treatment
- Initial Pharmacotherapy in Early Stages

All these procedures are available in the K4CARE Platform for the professionals in the Evaluation Unit to define the IIP of the target patient.

All the consecutive IIPs of a K4CARE patient are stored in the Health Care Record of that patient as the history of treatments that have been applied to that patient, and they are ready for consultation.

- **K4CARE Formal Intervention Plans**

FIPs on Anemia
- Recognition, Assessment, Treatment, and Monitoring Management in the Elderly

FIPs on Arthritis
- Treatment of Osteoarthritis

FIPs on Cognitive Impairment
- Treatment

FIPs on Coronary Heart Disease
- Treatment

FIPs on Chronic Obstructive Pulmonary Disease
- Pharmacological Treatment
- Astute Exacerbation Treatment

FIPs on Delirium
- Treatment

FIPs on Depression
- Pharmacological Treatment
- Depression with Cognitive Impairment Treatment
- Depression with Dementia Treatment
- Suicide Risk Assessment

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- Chronic Heart Failure Treatment
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- Initial Hypertension Treatment
- Treatment (Stage I)
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FIPs on Immobility
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- Pain Treatment

FIPs on Parkinson’s Disease and Parkinsonism
- Treatment
- Initial Pharmacotherapy in Early Stages

K4CARE Formal Intervention Plans (FIP) are a family of clinical algorithms that determine the way that diseases, syndromes, and social issues in the K4CARE project are treated. The formalism to represent FIPs is called SDA*, this standing for the combination of states, decisions, and actions. The K4CARE Platform implements mechanisms to edit, adapt, merge, learn, and execute SDA* algorithms. These SDA* algorithms are related to the K4CARE Electronic Health Care Records of the HC patients and they may be used to rule their treatment.

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