Overview	**Patient Journey Multiple System Atrophy (MSA)**			
PHASES	**1 – First symptoms**	**2 – Diagnosis**	**3 – Treatment**	**4 – Monitoring**
Disease	Presentation after the age of 30 years; average age of onset between 50 – 60+. Survival time is 6 – 9+ years, MSA is a multiple disease **with 5 or 7 key symptoms.** First initial symptoms are subtle and non-specific. Symptoms fall in two categories: • **motor symptoms** - include unsteady gait and difficulties standing, balance problems, slowness of movement, trembling and clumsiness, irregular tremor of the limbs. Parkinsonian symptoms are poorly responding to levodopa • **autonomic nervous system symptoms,** which are involuntary processes, e.g.heart rate, blood pressure, coughing urine, bowel and sexual function Additionally, other symptoms may include uncontrollable laughing or crying (called emotional liability), vivid dreams, noisy breathing during the day, excessive snoring at night, unintentional sighing, weak, quiet voice.	The difficulty of MSA lies in the range of symptoms requiring the setting up of a timely monitoring system at neurological clinics MSA is a clinical diagnosis and is subdivided into: • MSA **with Parkinson** (MSA-P) where slowness of movement, rigidity and tremor predominant • MSA **with Cerebellar** (MSA-C) where issues with balance, fine motor movements and speech are affected Different levels of diagnostic certainties were defined in the latest international diagnostic criteria: • Clinically established MSA • Clinically Probable MSA • Prodromal MSA, this is a research only category and has been drawn up so people with early signs of MSA can be considered for clinical trials. A **definitive diagnosis** of MSA is only possible from **examining the brain cells** from different parts of the brain under a microscope. The multiplicity of MSA in clinical practice raises the key question of managing the clinical diagnosis and maintenance treatment of the underlying symptoms of MSA: a) the solution of neuro-symptoms is most effective within the neurological clinic • sleep disorders • speech therapy problems b) they require multidisciplinary care since some treatment of the key MSA symptoms is done in other clinics (genito-urinary symptoms; gastro-dietary-nutritional; physiotherapy; respiratory...)	There are no effective neurological disease-modifying therapies available yet, so treatment is focused on management of symptoms The multiplicity of MSA symptoms requires the cooperation of different clinics. A patient with MSA in the **initial phase** of the disease does not necessarily have to be hospitalized in a neurological clinic for a long time. In the **second phase** of MSA disease development, the frequency of medical actions of individual developed symptoms at various clinics increases (respiratory breathing, cough assistant, home lung ventilation, gastro/ nutritional/ PEG, physiotherapy...). In the **third terminal phase** (usually already immobile, dependent on support technology) a patient with MSA can stay a) in specialized long-term hospitals, usually for a short time, or b) continue in home care (with adequate support for tracheostomy, pulmonary ventilation, cardio, nutritional support-PEG)	Referral to national expert centre with involvement of multi-disciplinary teams in view of this rare disease

Clinic	Careful history taking Extensive neurological examination **Investigations:** Check for postural (**orthostatic**) low blood pressure (**hypotension**), i.e. measure blood pressure, while lying flat on a bed and after 3 and 10 minutes of standing[1] Ultrasound (US) to assess post-void residual volume (PVR). An in-out catheterization also assesses PVR. Brain MRI scan and scan to be reviewed by Neuro-radiologist for subtle changes in different brain areas Consider doing MIBG scintigraphy of the heart or DAT Brain scan if available at a specialist clinic in unclear cases	**Suspect the diagnosis** if an individual has: • Parkinson and Cerebellar ataxia at the same time where there is family history of either disorder **OR** • Ataxia, Parkinsonism and autonomic failure, i.e. urinary incontinence in a person with no structural urinary problem, erectile dysfunction in a man less than 40 years old and/or neurogenic orthostatic hypotension (nOH)	Focus is on symptom management and supportive therapies: • Psychological & mental health support • CPAP therapy for excessive snoring, sleep apnoea and stridor • Palliative care strategies as needed **Medications** • Levodopa may sometimes be used to help Parkinson symptoms • Bladder symptoms are often helped with medication or self-catheterisation • nOH can be treated with midodrine, fludrocortisone. Other medications may be recommended at specialist centres • Clonazepam or melatonin before bedtime for REM-sleep behaviour disorder	Annual visits to specialist centre to assess: • motor • non-motor symptoms, • re-evaluate the diagnosis if the clinical symptoms and/or signs change significantly • capture side effects of treatment

Challenges	MSA can **often be confused with** a diagnosis of **ataxia or Parkinson's disease** in the initial stages
	
	Correct diagnosis is often delayed
		A missed diagnosis of MSA makes caring for the person more difficult as carers are not aware of the dangers of
		• Serious falls due to orthostatic hypotension,
		• Hypertensive emergencies in case of
		  ○ concomitant supine hypertension,
		  ○ Urinary tract infections and urosepsis,
		  ○ Respiratory symptoms, aspiration, choking, pneumonia
		• Malnutrition due to swallowing difficulties
			Need for research to find a cure for this devastating disease	• Finding a hospital doctor with experience in MSA
				• The practice of home care for MSA patients demonstrates the systematic medical supervision needs out of clinics
				• Access to specialist nursing service between hospital appointments

				• Primary care team to liaise with specialist services as needed for advice and symptom management
Goals	Observation for 'red flags' and/or more rapid progression than expected of original diagnosis e.g., Parkinson's, such as early falls, rapid impairment of movement, increasing autonomic symptoms, early speech and swallow problems Review those with neurological symptoms when a diagnosis is not reached or is in doubt. Get a 2nd opinion or consult colleagues at the ERN-RND.	Greater awareness by Health Care Providers on: 1) Diagnosis of MSA 2) Management of symptoms 3) psychological and emotional needs of people with MSA	Develop international cooperation for new therapies for people with MSA. Be mindful on how MSA impacts a person's life e.g. work, social life, relationships, finances, long-term effects, psychological effects, concerns. Develop a of care pathway for suspected and confirmed MSA	• Availability of qualified physiotherapy, nutrition treatment, psychological support, treatment for sleep disorder and continence issues • Carers/patients could share information about what supports are helpful and how to access them

1 Neurogenic orthostatic hypotension (nOH) is a form of low blood pressure. It happens when the blood vessels do not constrict (tighten) as you stand up. It is also known as postural hypotension and is defined as a decrease in Blood pressure (BP) within 3 minutes of standing of at least 20mm HG systolic or 10mm HG diastolic. If the person is unable to stand, the head up tilt (HUT) test is carried out. The person is titled up gradually with continuous blood pressure and heart rate monitoring.
Orthostatic hypotension (OH) is non-specific sign, it is usually a symptom of an underlying disorder rather than a disease in itself and should not be used in isolation. Delayed OH i.e., not present after 3 minutes but present within 10 minutes of upright position is included as a feature of clinically probable MSA

Please note that specific terms (e.g. home care services, general physician, physiotherapy) do not include the same services in all EU countries and might differ from country to country. Patient advocacy groups can often provide support and resources for patients and families.