

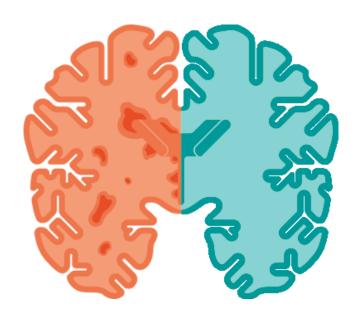


### **MULTIPLE SCLEROSIS**

#### **FACTS AND FIGURES**

SYMPTOMS INCLUDE<sup>1</sup> **PAIN FROM SPASTICITY BLURRED VISION** 

WEAKNESS **ATAXIA AND TREMOR BLADDER DYSFUNCTION FATIGUE** 





Estimated number of people living with Multiple Sclerosis worldwide

in 2020: 2.8 million<sup>2</sup>

United Kingdom has the highest death rate: 2.08 deaths per 100,000 in **2019**<sup>3</sup>



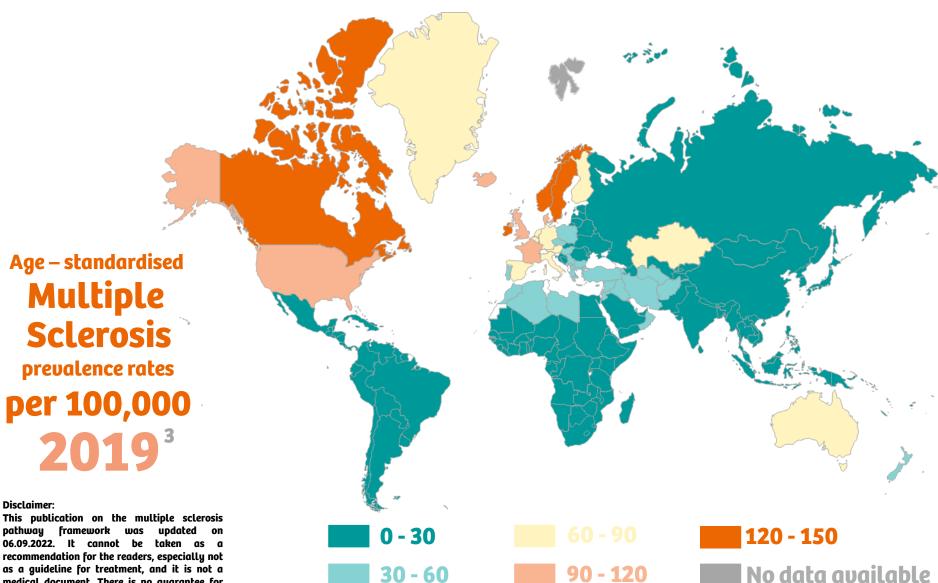
### **Total economic burden**

of Multiple Sclerosis in the United States in 2019 was \$85.4 billion, including \$63.3 billion in direct medial costs4



### RISK FACTORS<sup>1</sup>

- Vitamin-D deficiency
- **Epstein-Barr virus infection**
- Cigarette smoking
- **Family history**



### Disclaimer:

This publication on the multiple sclerosis 06.09.2022. It cannot be taken as a as a guideline for treatment, and it is not a medical document. There is no guarantee for completeness or global correctness, the various pain points, solutions, and statistical data are examples only. Sources are multiple, such as public statistics, expert opinions, open innovation workshops, research, own data and many more (see references).

The products and features mentioned may not be available in all countries and their future availability cannot be guaranteed. Some products mentioned are planned and under development.

- Mayo Clinic . Multiple sclerosis. Retrieved September 06, 2022, from https://www.mayoclinic.org/diseases-conditions/multiple-sclerosis/symptoms-causes/syc-20350269#:~:text=Those%20symptoms%20include%20loss%20of,sexual%20dysfunction%2C%20and%20walking%20difficulties
  Walton, C., King, R., Rechtman, L., Kaye, W., Leray, E., Marrie, R. A., Robertson, N., La Rocca, N., Uitdehaag, B., van der Mei, I., Wallin, M., Helme, A., Angood Napier,
  Baneke, P. (2020). Rising prevalence of multiple sclerosis worldwide: Insights from the atlas of MS, Third edition. Multiple Sclerosis Journal, 26(14), 1816–1821.
- https://doi.org/10.1177/1352458520970841
  Viz Hub. (2019). GBD Compare. Retrieved September 06, 2022, from https://vizhub.healthdata.org/gbd-compare/
- Bebo, B., Cintina, I., LaRocca, N., Ritter, L., Talente, B., Hartung, D., Ngorsuraches, S., Wallin, M., & Yang, G. (2022). The economic burden of multiple sclerosis in the United States. Neurology, 98(18). https://doi.org/10.1212/wnl.0000000000200150

## **MULTIPLE SCLEROSIS**

3 SYMPTOMS

**STAKEHOLDERS** 

**Encourages patient to seek** 

Ministry of Health

**PAINPOINT** 

n the early stages, some patients a

not familiar and don't know how to

deal with the symptoms of MS lik

fatigue, weakness, dizziness, bladde

and bowel dysfunction or gait

in the office

**Patient** 

Shows early unspecific

Neurologist

Checks the medical

history of the patient and

looks for any signs of

neurological damage.

and weakness during her normal workday

Disease pathway analysis with painpoints and solution examples

# Innovation Think Tank

Neurologist Evaluates the effect of

therapy on the disease

progression through MRI

**PAINPOINT** 

remitting MS (RRMS) can experier

aware of the severity

**PAINPOINT** 

SOLUTION

**PAINPOINT** Patient data exists in diverse form

(lab tests, MRIs) and may b

collected in different ways b

lifficult to meaningfully compa

formation across the MS populal nd to identify underlying trends.

**MS PATHS** 

To help address variations, MS

PATHS can be integrated into

routine office visits at MS centers.

Patient data is generated and

collected for research in an

efficient and standardized way so

that subtle changes in various aspects of MS can be monitored

accurately.<sup>60</sup>

rious MS centers, which makes i

research-based scientific hospital workflow experience allowed the identification of painpoints and solutions.

These solutions were proposed biosensors, nanorobotics smart wearable technologies.

Possibly affected by

harm the health of her

unborn child.

Obstetrician

related to pregnancy and

Multiple Sclerosis in the offspring.<sup>1</sup>

**Clinical innovation** 

glucose monitoring

Screening for diabetes in

early pregnancy, using a

highly integrated noninvasive continuous

**PAINPOINT** 

Late initiation of prenatal c

of MS in the unborn child.5

during pregnancy might increase risl

**SOLUTION** 

**Digitalization & Sensing** 

based maternal and

fetal monitoring

An IoT based device to provide

ubiquitous maternal health

monitoring during pregnancy

and fetal risk assessment using

wearable fetus monitoring to

ensure well being of the

that can send alerts.<sup>2</sup>

Encourages and helps

order to deliver efficient and

high-quality care across all

A pregnant woman suffering from gestational diabetes practices gardening

Pharmaceutical

Take care of research,

production, marketing and

**PAINPOINT** 

period is a risk factor for MS in

**SOLUTION** 

Digital therapeutics

A comprehensive approach

using wearables, digital

platforms and tele-coaching

can help to significantly lose

weight and adhere to a

4 COVID-19

**PAINPOINT** 

Due to lockdown, sunlight exposu

D levels of the mother. This might

put the child at a higher risk of

SOLUTION

Vitamin D sensing

Vitamin D monitoring sensors

can be used to make pregnant

women aware of their vitamin

D levels, based on which

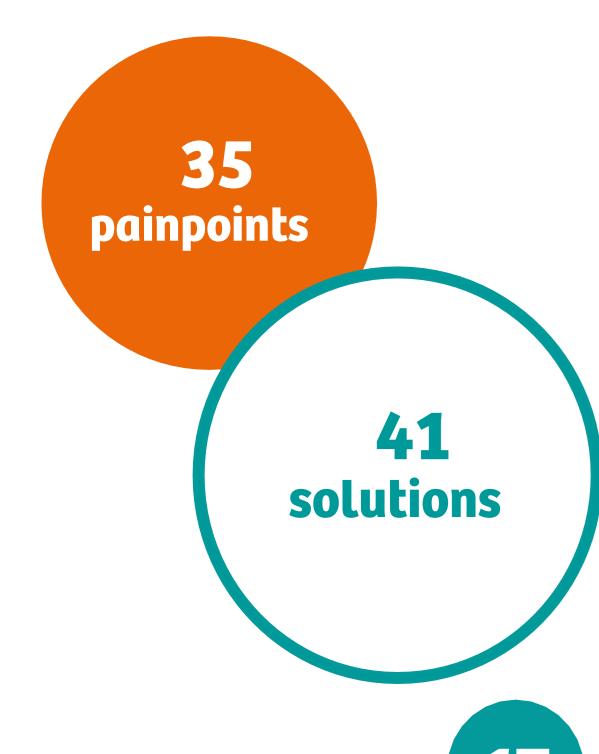
supplement intake can be

initiated.<sup>9,10</sup>

developing MS in adulthood.8

patient to take care of her

## **THROUGH THIS CAREPLAN WE HIGHLIGHT DATA FROM A COLLECTION OF**

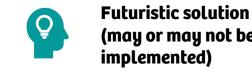


connected to different stakeholders

## Solution categories



Ongoing research in



## Disclaimer:

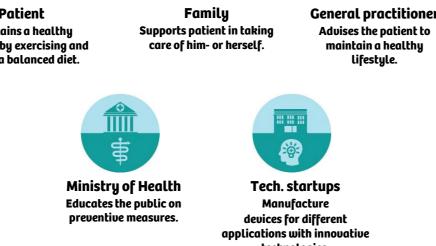
on 06.09.2022. It cannot be taken as a expert opinions, open innovation workshops, research, own data and many more (see references). mentioned are planned and under development.

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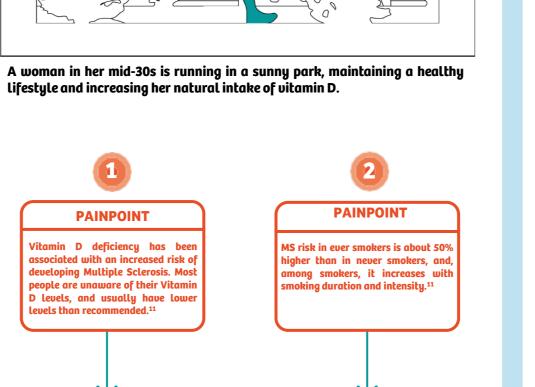
https://www.siemens-healthineers.com/careers/innovation-think-tank

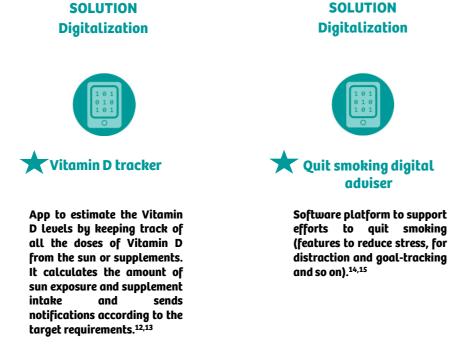
## 2 PREVENTION 1 PRENATAL Scenario: Pregnant woman in the garden Scenario: Woman running in the park **STAKEHOLDERS**

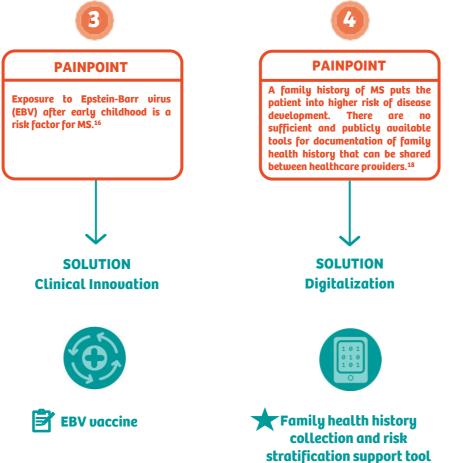
**STAKEHOLDERS** Supports patient in taking Maintains a healthy Provides care related to general lifestyle by exercising and care of him- or herself. medical problems, initiates











A patient centered family health

history computerized collection

tool with included clinical

decision support for patients and

strategies and education support

A vaccine that could prevent or

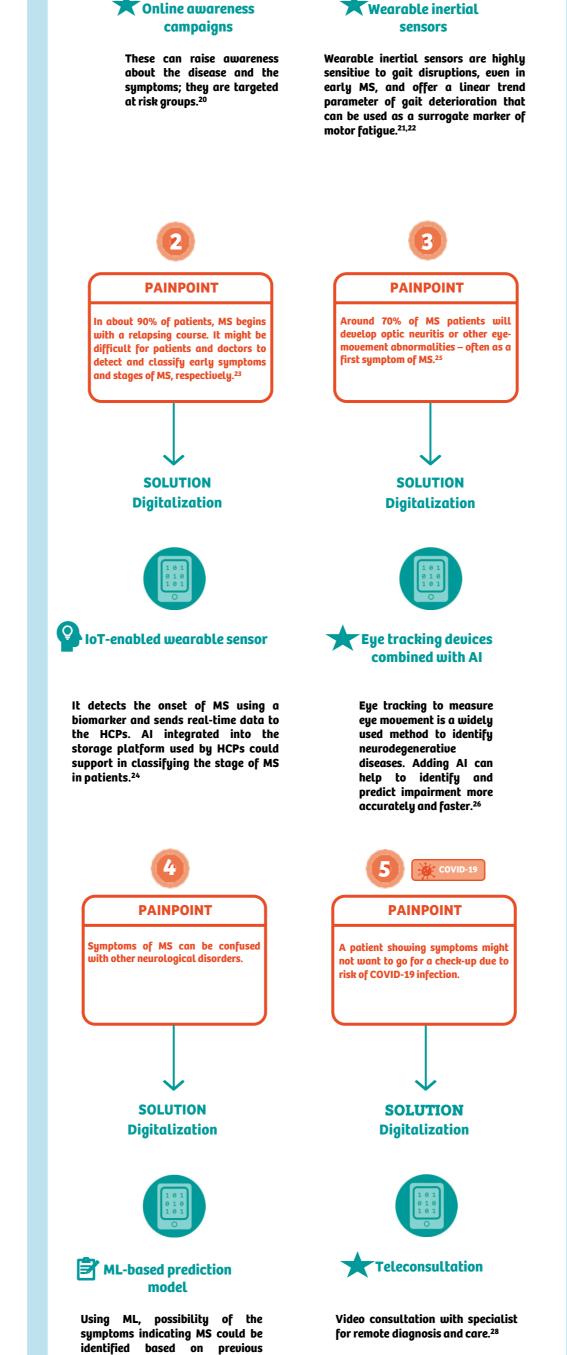
reduce the severity of infection

with EBV, could also reduce the

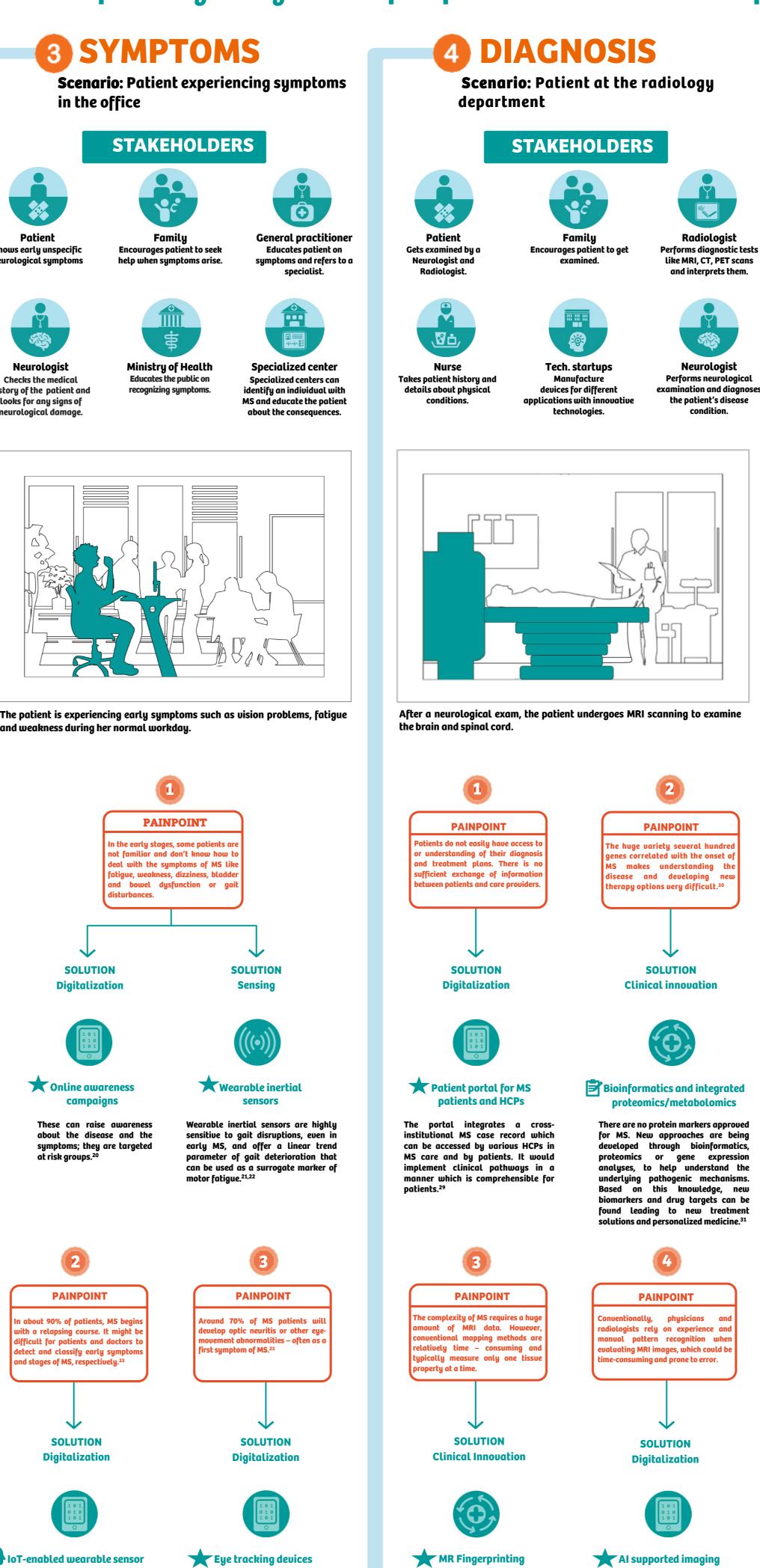
incidence of EBV-associated

malignancies and autoimmune

diseases like MS.17



patient data sets.27



MRF is a new approach to

MRI scanning measuring

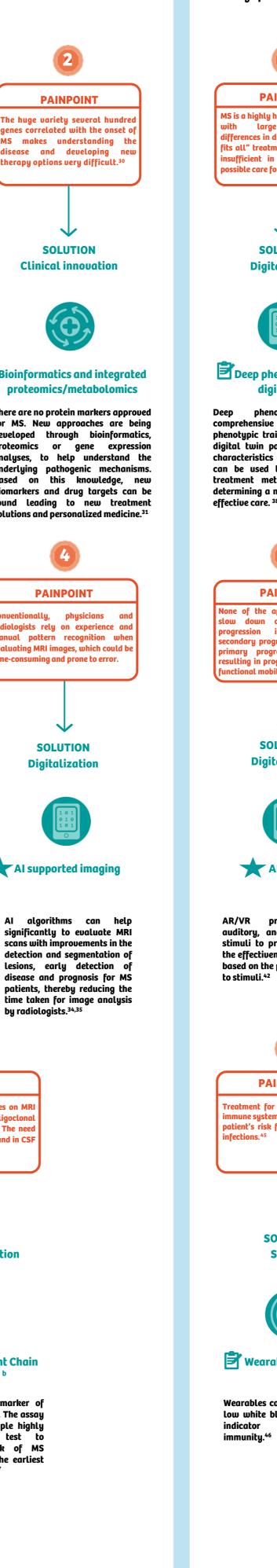
multiple tissue properties in

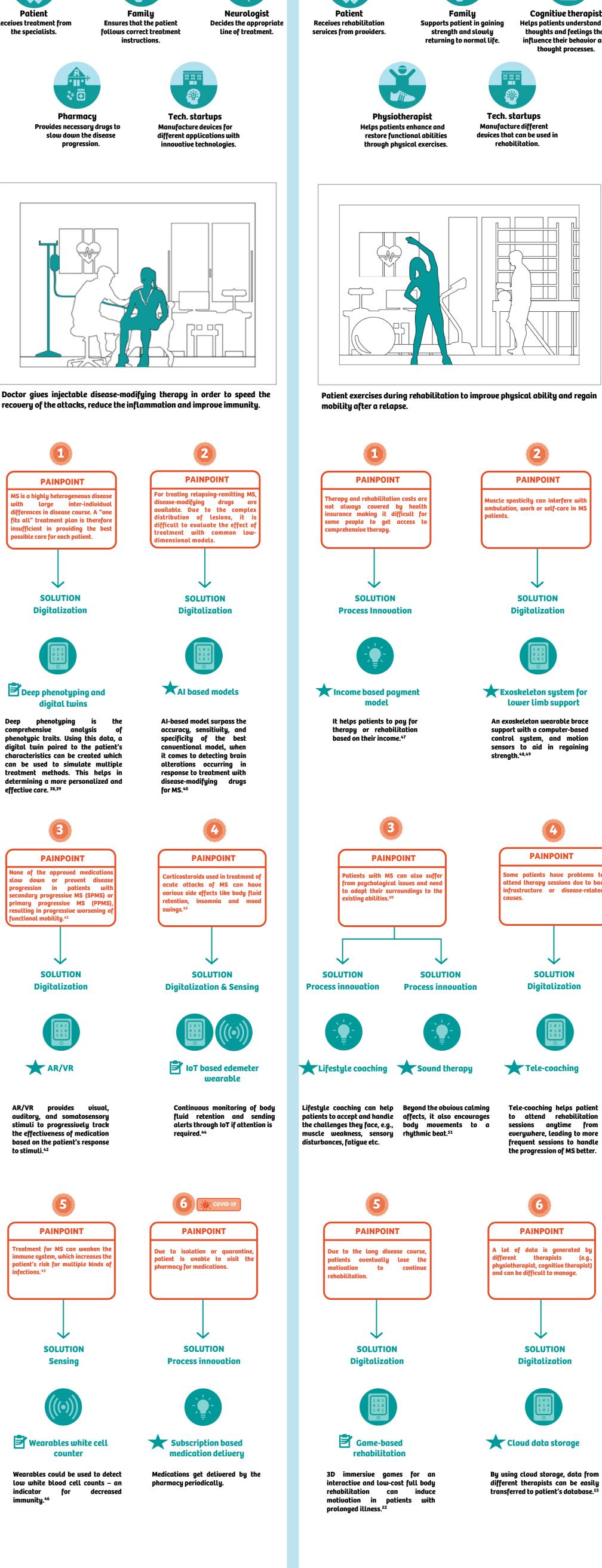
a single, time-efficient

acquisition – enabling

clinicians to make more

characteristics



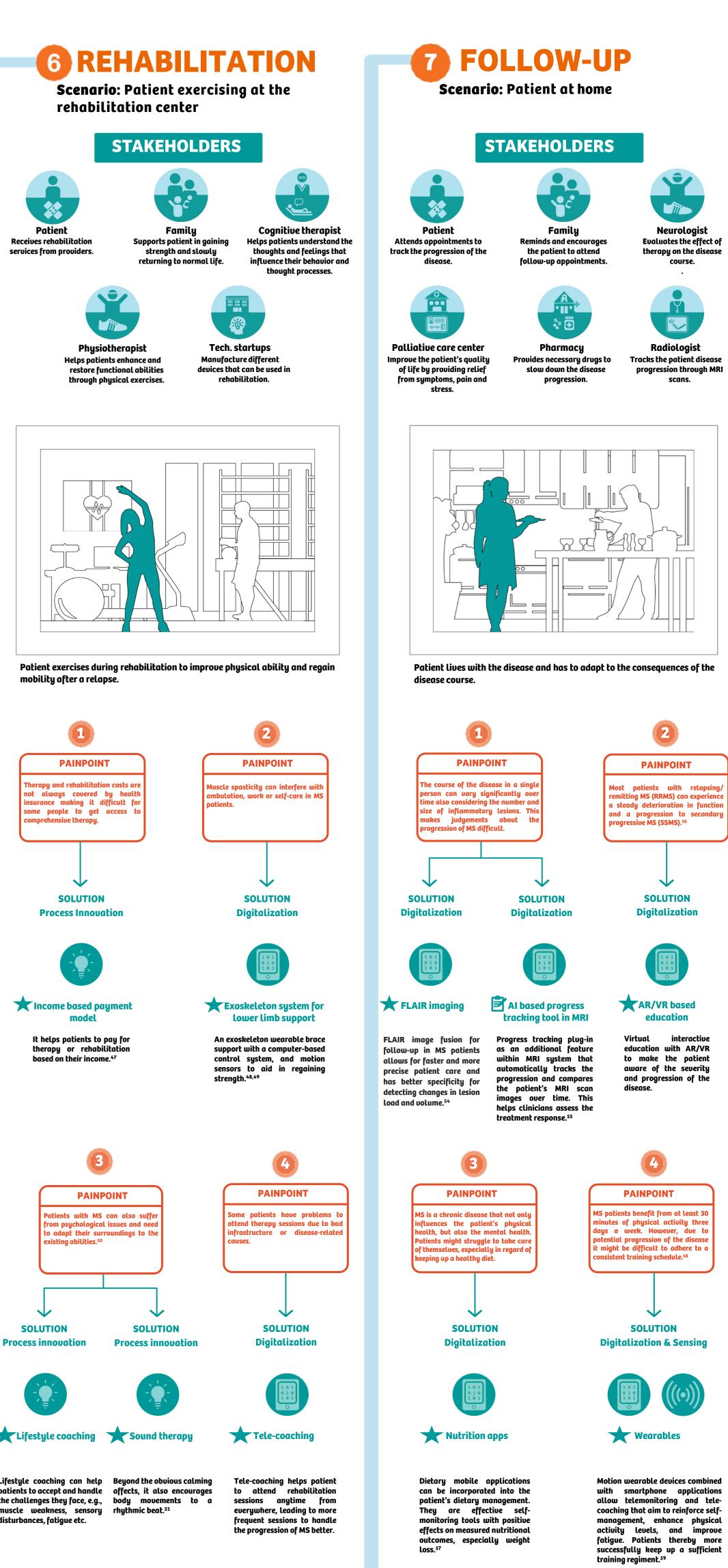


**5** TREATMENT

STAKEHOLDERS

the hospital

Scenario: Patient receiving treatment at



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<sup>a</sup>MR fingerprinting (SHS): The product is not for sale in the bADVIA Centaur sNfL (SHS): This product is under development and not commercially available. Its future

**PAINPOINT** 

AS diagnosis usually relies on MR

scans and oligoclona

mmunoglobulin G bands. The need

r reliable biomarkers found in CS

SOLUTION

**Clinical Innovation** 

Neurofilament Light Chain (sNfL) assay b

sNfL is a laboratory marker of

neuronal damage in MS. The assay

may function as a simple highly

standardized blood test to

prognosticate the risk of MS

disease activity from the earliest

stages of the disease.<sup>36,37</sup>

nd blood is high.