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CLINICAL MANAGEMENT OF NECK AND LOW BACK PAIN THROUGH PERSONALISED PROGNOSTIC MODELS: THE BACK-UP PROJECT

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BACKGROUND

Neck and Low Back Pain (NLBP) are among the leading causes of years lost to disability [1,2]. Clinical studies carried out in the last thirty years have produced scientific evidence about the influence on NLBP of multiple factors (biological, physical, psychological, and socioeconomic), and the efficacy of many types of treatments (physical, pharmacological, cognitive, behavioural, etc.) for different profiles of patients [3].

Back-UP is an IT platform to facilitate the management of nonspecific NLBP, based on personalised prognostic models with data from multiple physiological and psychological dimensions.

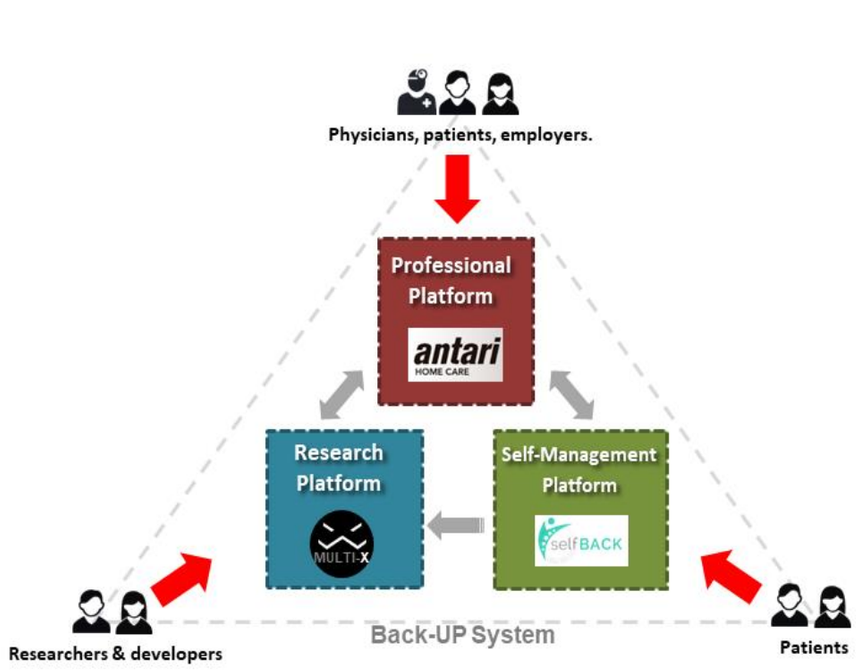
METHODS

Back-UP's infrastructure is based on three platform:

A *Professional Platform* based on GMV's Antari Home Care for clinicians and patients to get the prognostics, recommended treatments, and monitor the progression of each case: https://backup-homecare.gmv.com

A *Researcher Platform* based on CISTIB's Multi-X, to develop models, and investigate with anonymized data: https://backup.multi-x.org

A *Self-management Platform* based on selfBACK, a personal app to deliver tailored self-management plans: https://www.selfback.eu



The target functionalities of Back-UP's development are:

1. Patient stratification and selection of matched treatments
2. Self-management
3. Rehabilitation
4. Return to work
5. Assessment of integrity in insurance context
6. Baseline assessment & follow-up at 3, 6 and 12 weeks
7. Costing estimations
8. Feedback, reporting and management

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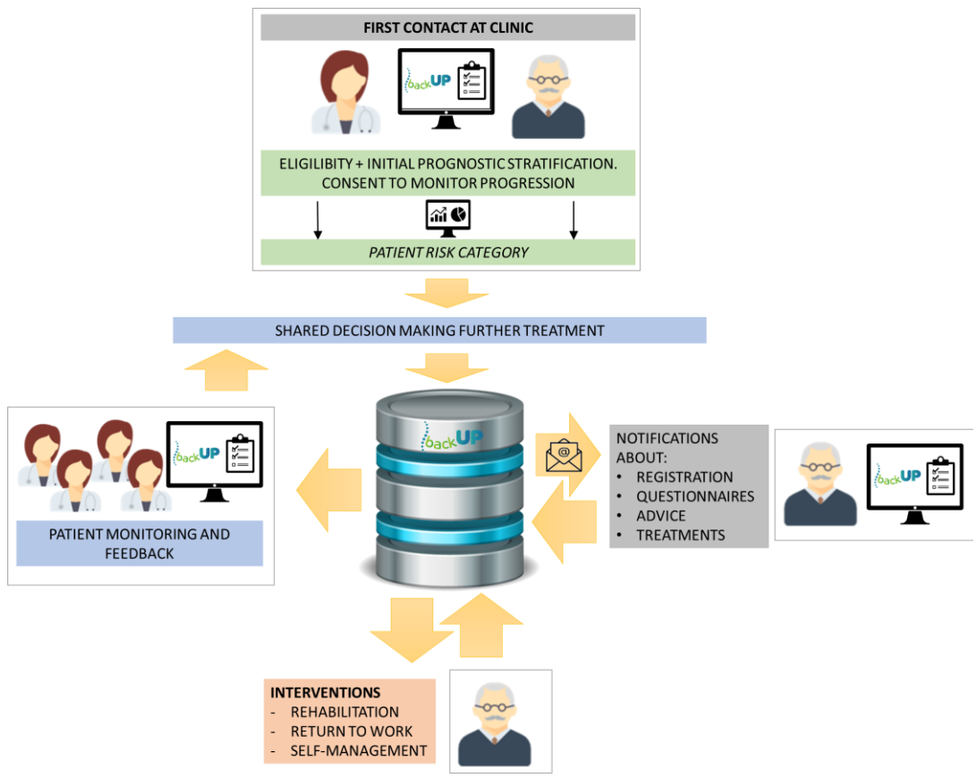
MAIN USE CASES OF BACK-UP

First contact at clinic
A set of 12 prognostic questions is used to allocate patients into the corresponding risk category for predicted outcomes. Recovery graphs and quantitative estimations of pain, function and time-off-work over the next 6 months, plus 22 evidence-based recommended treatment options.

Return to work
Users registered in Back-UP will have access to an online vocational advice module and occupational assessment. The online vocational module will provide advice and support materials to help patients manage pain in relation to their work.

Rehabilitation
Patients following formal rehabilitation will provide additional data through self-reported outcomes and physical measurements during rehabilitation sessions. Those data will help to monitor the progress, and compare results with predictions and goals. Collected data will be used in a continuous learning cycle to improve predictions.

Self-management
Back-UP will facilitate self-management with learning materials, and tailored exercise and activity plans through the selfBACK system.



Back-UP collects, manages and analyses health data from multiple domains, from the smallest to the largest scales of the human being, including but not limited to:

- *Biomarkers*: relationship the glycan profile and chronic back pain.
- *Biomechanics*: movement analysis for the estimation of progression and patient collaboration in the treatment of whiplash-related neck pain.
- *Psychosocial traits*: measures related to perceptions, socioeconomic situation and beliefs, to predict pain, function and time off work.

Models are based on recent experimental studies and Machine Learning, to predict future pain, progression and associated risks and costs.

References

[1] Hoy et al. *Ann Rheum Dis* 2014:1-7. DOI: 10.1136/annrheumdis-2013-204431
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[3] Carlsson et al. "Neurophysiology of back pain", 2000:149-63. ISBN: 9780781727600