Four patient segmentation criteria that affect effectiveness of solutions

Autonomy

Whether patients could complete tasks on their own, without the additional assistance from family/caregiver.

KEY FACTORS

- Severity
- Control
- Level of attention

Motive

Emotions/mindset (self-efficacy) of patient affects effectiveness of intervention tactics and pattern of patients' behaviours.

KEY FACTORS

- Motivation
- Proactiveness
- Disease relation
- Independent health decisions
- Emotional distress
- Acceptance
- Stage
- Confidence

TA/DA

Receptiveness

Patient receptiveness towards various treatments, interventions and HCP advice. Patient willingness to socialize with peers with the same TA/DA.

KEY FACTORS

- Trust & openness
- Receptiveness
- Sociability

Accessibility

Whether patients could access and use the intervention solution without any barriers.

KEY FACTORS

- Availability of care
- Accessibility to healthcare
- Digital fluency
- Affordability

LEGEND

- Key factors influencing the effectiveness of type of patient-facing solution

  e.g.: How effective is a participatory medication tracking app for a patient in the 'high autonomy, motive & receptiveness' segmentation?

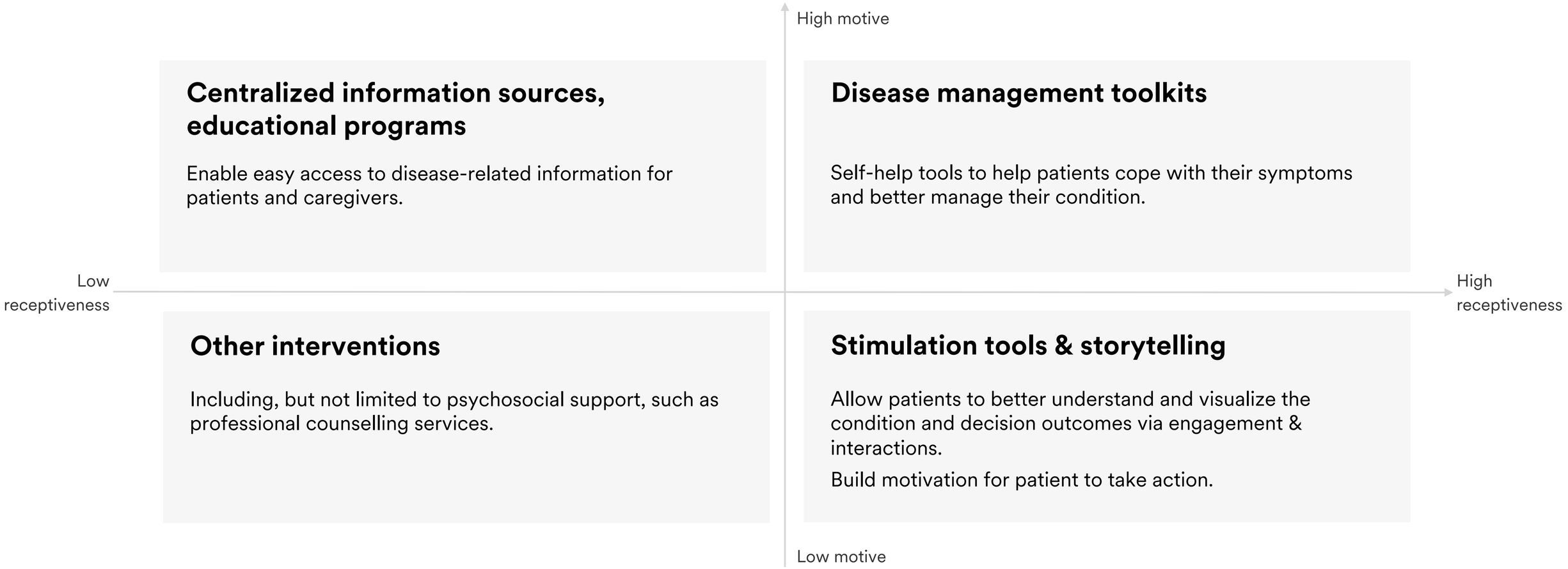
- Key factors determining the suitability of specific solution's implementation, delivery method, etc.

  e.g.: Do we need to collect data on patient's bowel movements (UC) or pain level (RA)? Can a patient afford certain technology or treatment options?

Note: See extended section for more details on how these criteria are derived.

Opportunity area:
Awareness/Info

Awareness/Info influenced by receptiveness & motive



[1] There are considerable support for the effectiveness self-help patient toolkits in bringing about positive clinical outcomes. [source]

[2] Part of the reason why patients may have high resistance to seek out information lies in how the required effort to do so can perceivably outweigh their benefits. [source]

[3] Simulation tools like storytelling have been used in patient education to more effectively deliver health information. Disease simulation tools like storytelling tend to be uncommon interventions in the medical space hence patients with lowered receptiveness may not be inclined to adopt it. [source]

[4] Disease simulation tools like storytelling are uncommon & not readily observed/seen in the medical space. Technologies with lowered observability tend to face greater resistance to adoption, especially amongst patients with lower receptiveness [source].

HCP – Pt. influenced by receptiveness & motive

Opportunity area:
HCP – Pt. communication

High motive

Build trust with patients

More face-to-face interaction between HCP & Pt to build trust and empathy. Provide alternative sources for patient to access information.

Support group could be helpful.

Involved decision making

Patients are more likely to expect involved decision making and proactive enquiries.

Enable seamless and two-way communication (both virtual & in-person are desirable)

Low receptiveness

HCP dashboard

Having an HCP facing dashboard would help the HCP – Pt relationship across all segment; it also enables the HCPs to conduct segment-specific interventions

High receptiveness

Other interventions

May require psychological counselling or social support programs to facilitate the patients' experience.

Require more HCP – Pt. interactions to cultivate trust in HCP at an early stage. Address "Motive" first.

Clear instructions & communication

Provide clear and comprehensive instructions to patients.

Use encouragement to build patients' motivation.

Low motive

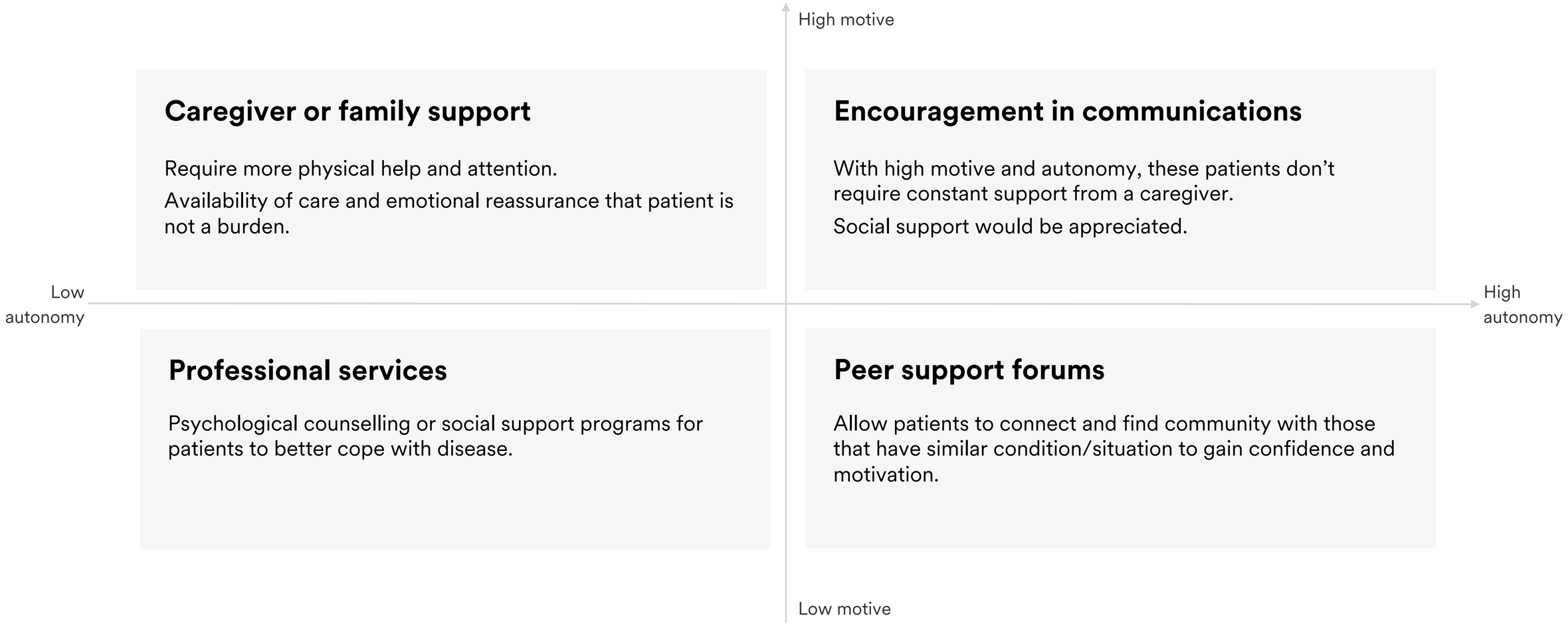
*Low **autonomy** patients require interventions with greater HCP attention [source]

[1] Patients who trust their doctors are open to understanding their views and concerns would be more comfortable to involve themselves in the treatment decisions.[source]

[2] Communication with higher level of interpersonal treatment tended to yield greater trust between HCPs & Patients. Effective Patient-HCP communication is associated with better adherence to treatment & patient health outcomes. [source]

[3] Patients with lower trust of HCPs, in terms of their expertise, judgement and commitment to patients, may wish to better involve themselves in their treatment recommendations [source]

Patient support influenced by autonomy & motive



[1] Patients with higher disease risks tended to require greater intensity in intervention and support should be more involved and personal. [source]

[2] Peer support helps to uplift the motivation of patients in seeking treatment largely through alleviating the emotional distress within them [source]

[3] Counselling approaches, in particular motivational interviewing is cited as the most effective for patients unmotivated to change as they focused on building motivation for, and reducing resistance to, behavior change [source]

Tracking solution influenced by autonomy & motive

High motive

Low autonomy

High autonomy

Low motive

Automatic tracking

Tracking solutions that requires minimal input and effort from patients.

e.g. AbilifyMyCite pills

Participatory tracking

Input tracker for patients.

Using reminders to reinforce and form positive behaviors.

e.g. Care4Today

Other interventions/technology

New technology interventions, or support programs to supplement tracking solution.

e.g. Skin reminders

High engagement tracking

Solution with additional incentives to motivate & engage users, such as gamification or rewards.

e.g. -

[1] Patients that are less able to manage their disease are shown to benefit from adherence devices with greater levels of surveillance. [source]

[2] Empirical studies lend support to the effectiveness of incentive-based tracking with medication adherence. Gamified tracking solutions can also bring about more desirable health behaviors through the support of intrinsic motivation & wellbeing uplift. [source 1] | [source 2]

Emerging HC solutions benefit lower spectrum criteria

Low autonomy

Medication in alternate forms (e.g. In food)

Personalized medications (e.g. 3D printed pills to minimize the complication of taking multiple medications)

Subscription medicine delivery services [1]

Interactive robot as digital personal companion

Low receptiveness

On-demand and integrated teleconsultation

Medication in alternate forms (e.g. In food)

Personalized medications (e.g. 3D printed pills)

Low motive

Subscription medicine delivery services [1]

VR technologies for pain management [2][4]

Medication in alternate forms (e.g. In food)

Personalized medications (e.g. 3D printed pills)

On-Demand and integrated teleconsultation (e.g. Healiom, Omcare) [3]

Interactive robots as digital personal companion

Accessibility

On-demand and integrated teleconsultation

Subscription service or new delivery services

Integrated payer/claims system

[1] Refers to pre-emptively replenishing patients' medicine supplies directly to patients' residence as opposed to the need for patients to manually refill them at clinics / pharmacies.

[2] Virtual Reality are used to help patients better manage symptoms of diseases that can hamper their motivation. [source]

[3] Teleconsultation was found to be advantageous to increasing patients' motivation for treatment in 8 separate studies, mainly because of how it encourages and better engages communication between HCPs & patients. [source]

[4] Patients report decreased pain intensity after a VR intervention [source], and patients with severe pain reaped the most health outcome from VR [source]. This helps them better manage the pain.

Step 2: Extended section

Patient segmentation in details, patient archetype examples and some competitor case studies

Skip to Step 3: Prioritization

Segmentation is based on correlations between value-driven key factors

A preliminary proposal

Value driven segmentation needs → Key factors for consideration → Segmentation criteria* based on correlation of key factors

Patients

- **Improvement in disease management**
  - QOL
  - Condition
  - Perception
- **Improvement in accessibility**
  - Social support
  - HCP communication
  - Healthcare solution

HCP

- **Optimal decision making**
  - Diagnosis & treatment
  - Ease of use
  - Data access
- **Patient communication Channel/ Tools to reach & support patients**
  - Improved PT mindset
  - Patient discovery (tent)
- **Cost reduction**
  - Solution
  - Future healthcare cost

#Condition

Severity
Stage
Control
Level of attention

#Demographic

Digital fluency
Affordability
Disease relation
Accessibility to healthcare

#Relationship

Availability of care
Trust & openness
Sociability
Receptiveness
Proactiveness

#Mindset

Motivation
Independent health
Confidence
Acceptance
Emotional distress

Autonomy

Severity | Control | Level of attention

Motive

Motivation | Proactiveness | Disease relation | Emotional distress | Independent health decisions | Acceptance | Stage | Confidence

TA/ DA

Receptiveness

Trust & openness | Sociability | Receptiveness

Accessibility

Availability of care | Accessibility to healthcare | Digital fluency | Affordability

LEGEND

- Key factors influencing the effectiveness of type of patient-facing solution
- Key factors determining the suitability of specific solution's implementation, delivery method, etc.

*Criteria combined factors with high correlation to each other, i.e. higher severity requires higher level of attention.

Follow the 3-step framework – Step 2 Extended section

Supporting evidence for segmentation key factors

Key factors for consideration

#Condition

- Severity
- Stage
- Control
- Level of attention

#Demographic

- Digital fluency
- Affordability*
- Disease relation
- Accessibility to healthcare

#Relationship

- Availability of care
- Trust & openness
- Sociability
- Receptiveness
- Proactiveness

#Mindset

- Motivation
- Independent health
- Confidence
- Acceptance
- Emotional distress

#Condition

Severity and stage of disease as indicated by risk of hospital admissions are used as segmentation criteria in the ValCronic Program [source]

The Bloem & Stalpers model segments patients based on the level of control they have over the disease [source]

#Relationship

The XARELTO Afib segmentation survey segment patients based on their availability of care, trust / openness and proactiveness [source]

Dongen (2014) regards receptiveness to new treatment as a factor affecting patients' motivation in their segmentation attempt [source]

"Better Health London Report" categorise patients that are socially excluded a distinct patient segment where special care is required [source]

#Mindset

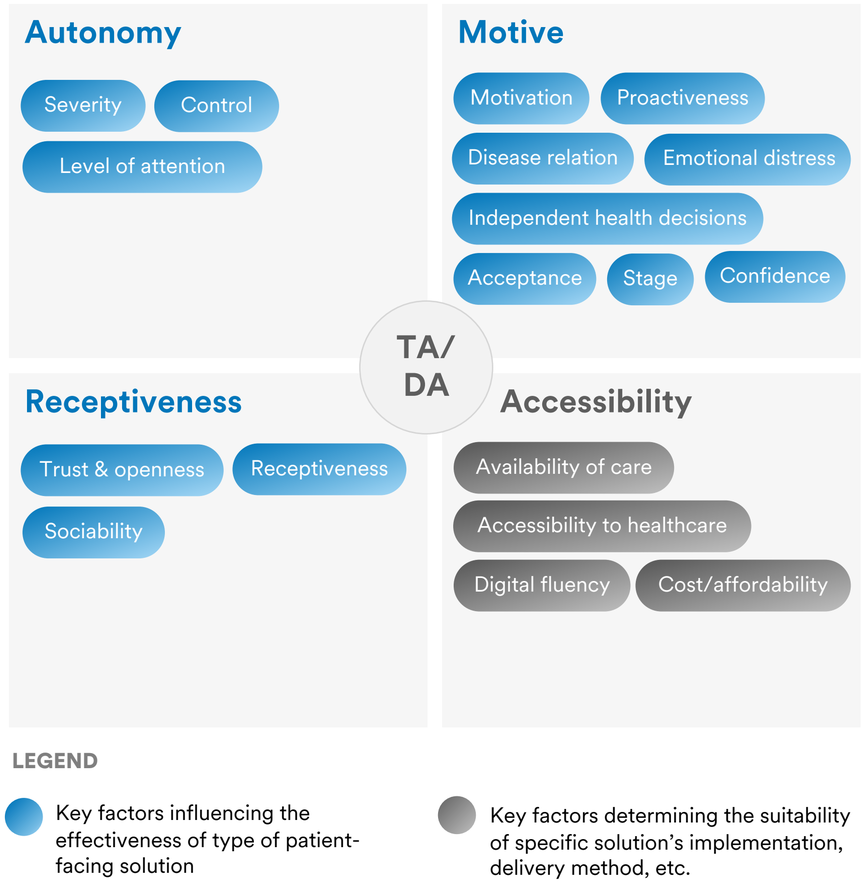
Dongen (2014) uses motivation as a segmentation criteria for Chronic Obstructive Pulmonary Disease (COPD) and Multiple Sclerosis (MS) patients [source]

Brommels (2020) identifies patients' "willingness to take responsibility for their own health" as a basis for patient segmentation [source]

Bloem & Stalpers model regards the acceptance of disease as an important psychological determinant to be used in segmenting patients [source]

Supporting evidence for segmentation criteria where the key factors correlate

Key segmentation criteria



Autonomy

Severity of disease is a key determinant of the level of attention a patient requires & his ability to be in control of the disease [source, source]

Receptiveness

Patients' relationship with HCP in the form of a trusting relationship could pave the way for better acceptance of HCP recommendations [source]

Culture, family & friends could influence patients' treatment decisions, especially for pre- and post-encounter decisions [source, source]

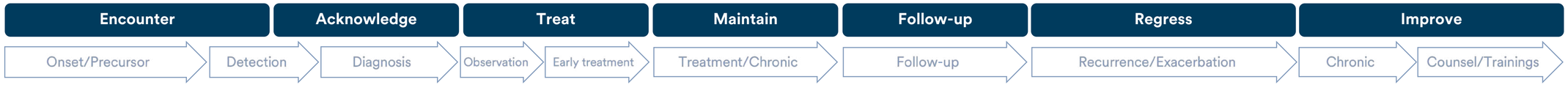
Motive

Psychographic metrices have been used as means to segmenting healthcare consumers. Variables that measure the proactiveness & health independence of patients are used to segment patients based on their motivation. [source]

Patients' desire to find purposes as part of their need for self-fulfillment is a measure for patient motivation [source]

Patients who better accept their disease, as measured through the Acceptance of Illness Scale (AIS), also tended to require lower levels of emotional support [source]

Data endpoints across the patient journey can be used to develop and improve the patient segmentation logics



Behavior/Mindset

Mobile apps, EHR obtained at point of care, Randomized clinical trials, PT social channels, etc.

- Receptiveness/Acceptance (towards new plan, cost, term, etc.)
- Lifestyle rhythm & habits
- Motivation & Confidence
- Sociability
- Mood
- Emotional wellness indication
- Level of autonomy
- Health literacy level

Condition/Disease

EHR obtained at point of care, Patient portal, Wearables, Medical devices, etc.

- Stage (acute/chronic)
- Vitals/Physiological data
- Pain/discomfort level
- Occurrence frequency
- Medication history (prescription details, response to medication, allergy)
- Medication refill frequency & method
- Family medical history

HCP & Socioeconomic

EHR obtained at point of care, Patient portals, Claims data, etc.

- Demographics (age, sex, race, location)
- Social status
- Availability of social support
- HCP preference
- HCP communication preferred channel & duration/frequency
- Plan/Price of medication
- HCP's ease of treatment decision

Product performance

App analytics, User testing, Randomized clinical trials, etc.

- Usage frequency
- Onboarding
- Engagement
- Settings preferences (notifications)

Value to JPKK & Payors

Real-world evidence generation to evaluate the effectiveness of medications or other interventions

Early detection, uncovered needs, more effective treatment plans, reduced cost for payors

Population data

Value to HCP

Focused and more optimal decision making for HCP

More efficient treatment plan that reduces wastage of medication or HCP resources

Improve HCP - Pt relationship in the long run

Value to Patient

More accurate diagnosis for patients

More suitable solutions for patient with distinctive needs

More efficient solution tactic based on the segments

Note: List of data endpoints is not exhaustive

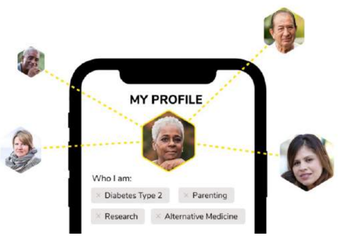
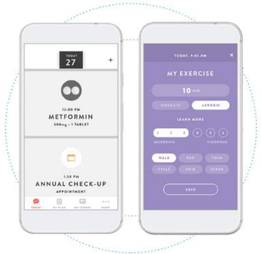
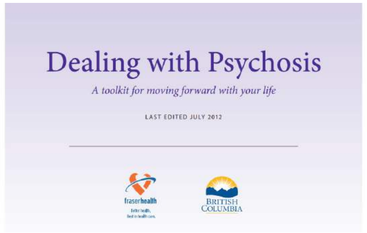
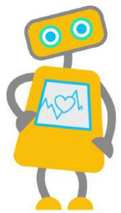
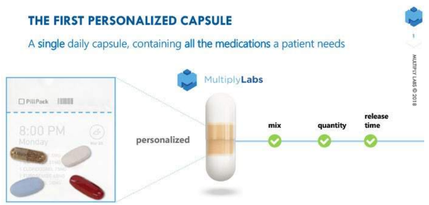
Patient archetypes based on segmentation criteria

Example of archetypes from both extreme ends and how opportunities differ based on their profiles

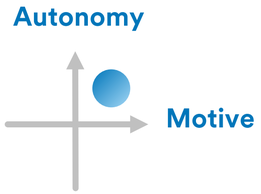
Pt. profile \ Opportunity	Awareness/Info	HCP - Pt. communication	Patient support	Sensor & tracking	Emerging HC solution
Healthcare Ideal  High autonomy High motive High receptiveness Form, **reinforce** and enhance the **behavior** of this patient	Self-help tools to help patients cope with their symptoms and self-manage their condition better. **EXAMPLES** heretohelp toolkit & info site	Enable seamless and two-way communication (both virtual & in-person are desirable). **EXAMPLES** Tomonawa *Used by JPKK Welby *Used by JPKK YaDoc system	With high motive and autonomy, these patients don't require constant support from a caregiver. Social support would be appreciated. **EXAMPLES** PatientsLikeMe community forum	Patient participatory input tracking solutions. Incorporate flexible reminders to promote better medication behavior. **EXAMPLES** Popit med tracking system Carte health status tracking app YourManager med packaging design Care4Today *Used by JPKK	On-demand and integrated teleconsultation services. New delivery service models. **EXAMPLES** LINE Doctor on-demand and integrated teleconsultation
Most Attention Needed  Low autonomy Low motive Low receptiveness Enhance **motivation** to better cope with the disease	Provide information access to social group or close circles to create rapport and build confidence. **EXAMPLES** Smile Navigator resource & info site	Require more HCP – Pt. interactions at an early stage to cultivate trust in HCP. **EXAMPLES** Welby *Used by JPKK YaDoc system	Psychological counselling or social support programs for patients to better cope with disease. **EXAMPLES** LitaLico return to work support Woebot AI mental healthcare tool	New technological intervention into tracking solutions. Keep caregiver in the loop of Pt. medication behavior. **EXAMPLES** AbilifyMyCite® pills with sensor Zio by iRhythm heart rhythm monitor	Emerging HC solutions that enable Pt. in their journey to making better health decisions for self. **EXAMPLES** Vita VR treatment MultiplyLabs 3D printed pills Mabu AI robot companion

Patient archetypes based on segmentation criteria

An example of archetypes from both extreme ends and how opportunities differ based on their profiles - Solution examples

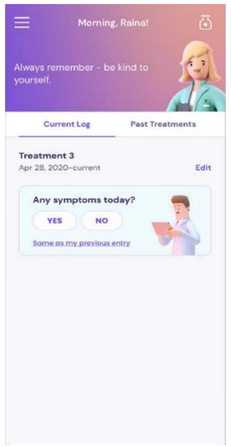
Pt. profile \ Opportunity	Awareness/Info	HCP - Pt. communication	Patient support	Sensor & tracking	Emerging HC solution
Healthcare Ideal  High autonomy High motive High receptiveness Form, **reinforce** and enhance the **behavior** of this patient	Educational self-help programs	2-way communication	Social peer-to-peer support forum	Patient participatory tracking	On-demand and integrated teleconsultation
					
	Toolkits for Neurological Disorders	Yadoc	Patients Like Me	Care4Today	LINE Doctor
Most Attention Needed  Low autonomy Low motive Low receptiveness Enhance **motivation** to better cope with the disease	Disease management toolkit for patient & support group	HCP Dashboard to enable early HCP – Pt. interactions	Digital behavioral health support	Automatic tracking	Personalized medications
					
	Here to Help Toolkit	Welby	Woebot	AbilifyMyCite®	MultiplyLabs

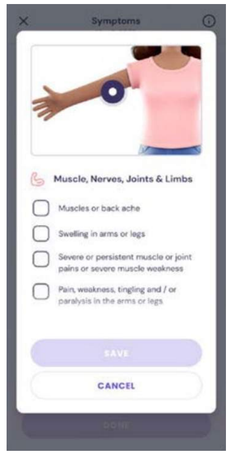
Competitor case studies by patient segments



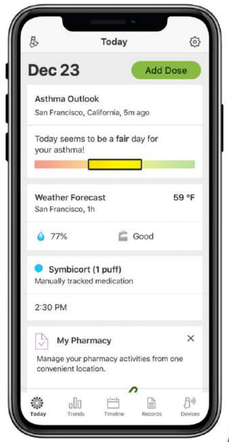
High Autonomy, High Motive

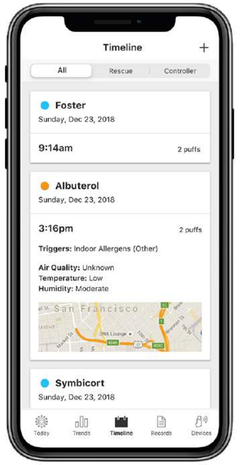
Sensor & tracking	Awareness/Info
keycare™	MERCK
1 Patient diary for symptom tracking, disease management, information for patients on KEYTRUDA® treatment.	ONCOLOGY





Sensor & tracking	HCP – PT communication
Propeller	gsk GlaxoSmithKline
2 Hardware device paired with mobile app to collect RWD from PT and generate insights; HCP dashboard.	RESPIRATORY

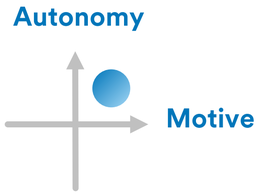




[1] The Keycare Patient Diary – A simple way for you to record your symptoms whilst on a KEYTRUDA® (pembrolizumab) treatment [source]

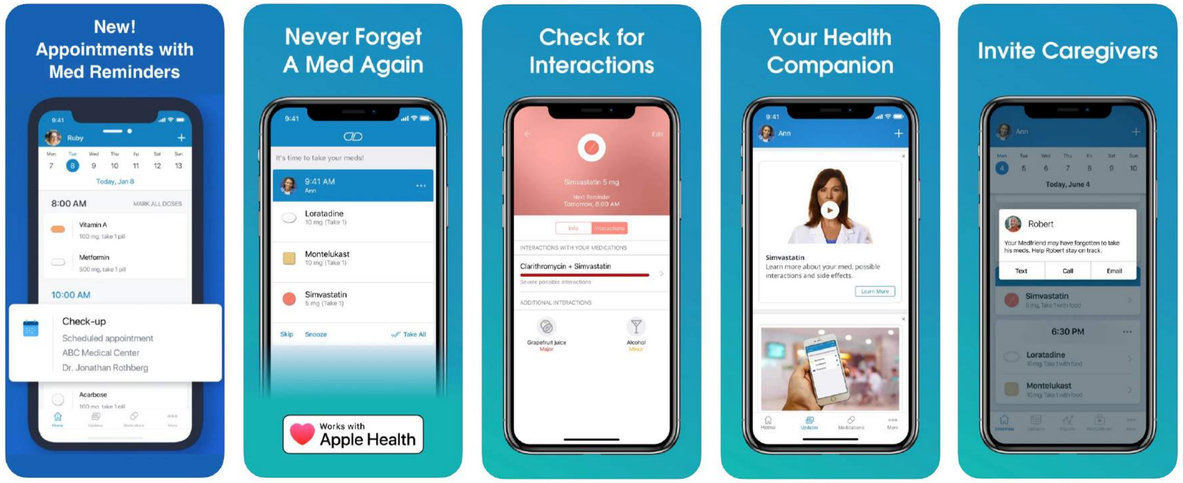
[2] Propeller – Asthma/COPD management [source]

Competitor case studies by patient segments



High Autonomy, High Motive

Sensor & tracking	Patient support	Awareness/Info
Medisafe	MERCK	
1 Digital drug companion integrated with HealthKit, S Health & Google Fit, customizable reminders, toolkits, support group intervention and sync with HCPs.		VARIOUS (CARDIOMETABOLIC)

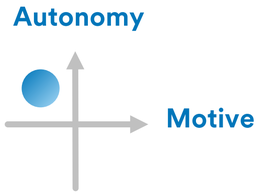


Sensor & tracking	Awareness/Info
my mhealth	my mhealth
2 Comprehensive platform for disease management with data syncing, tracking, toolkits, interactive guides, insights & forecasts etc.	VARIOUS

[1] Medisafe digital drug companion [source]

[2] My mhealth – Digital therapeutics for long-term conditions [source]

Competitor case studies by patient segments



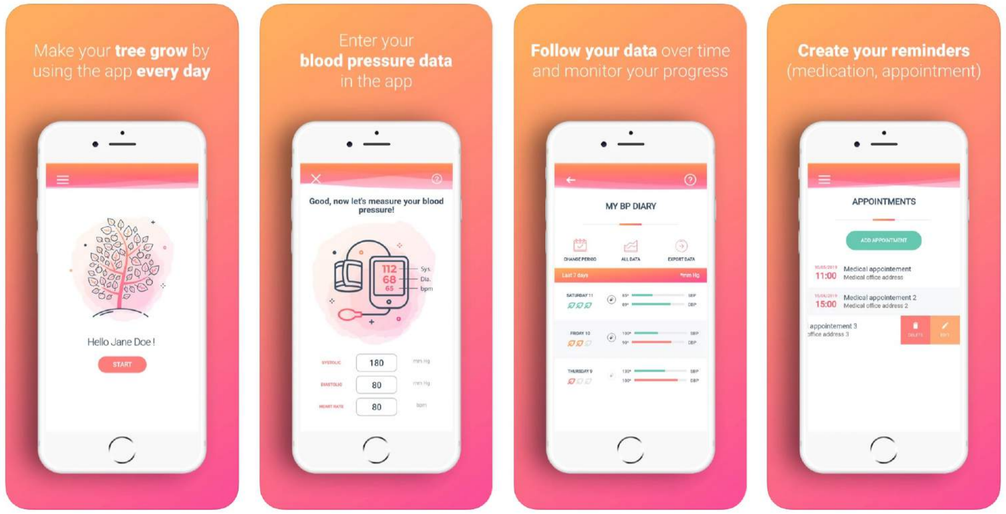
High Autonomy, Low Motive

Sensor & tracking | **HCP – PT communication**

MyBP CONTROL | SERVIER

1 Use with external monitoring device; receive reminder and manually input, share data with HCP; gamified to engage users.

CARDIOVASCULAR

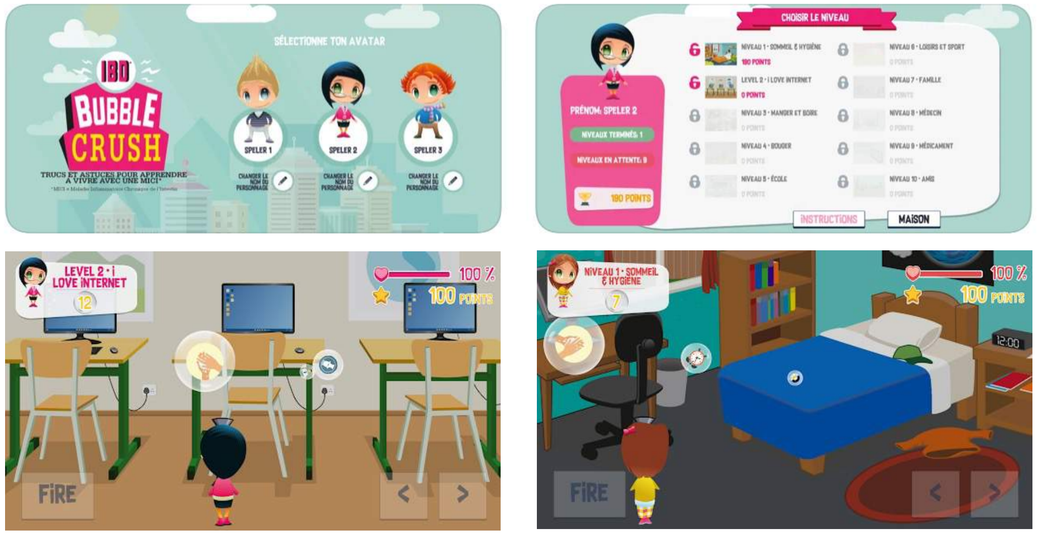


Awareness/Info

IBD Bubble Crush | abbvie

2 Gamified app designed for kids and adolescents to learn more about IBD and tips on disease management.

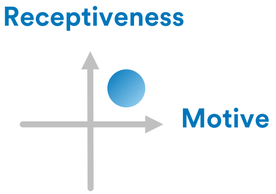
RESPIRATORY



[1] My BP Control – monitor blood pressure [source]

[2] IBD Bubble Crush – learning about IBD in a fun way [source]

Competitor case studies by patient segments



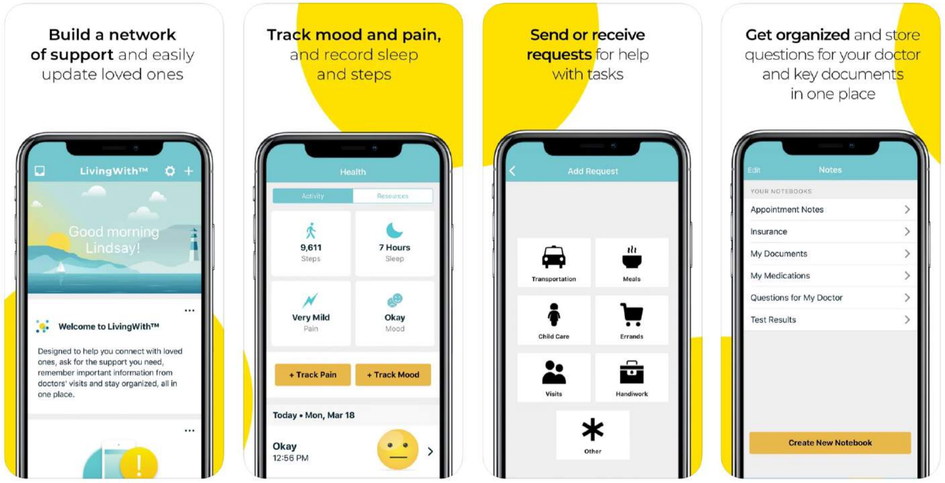
High Receptiveness, High Motive

Sensor & tracking	Patient support
HCP – PT communication	**Awareness/Info**

LIVINGWITH | Pfizer

1 Cancer management app – patient input & sensor tracking info for different tumour types; tool to facilitate PT - HCP communication; close circle support & community events (PT initiated)

ONCOLOGY

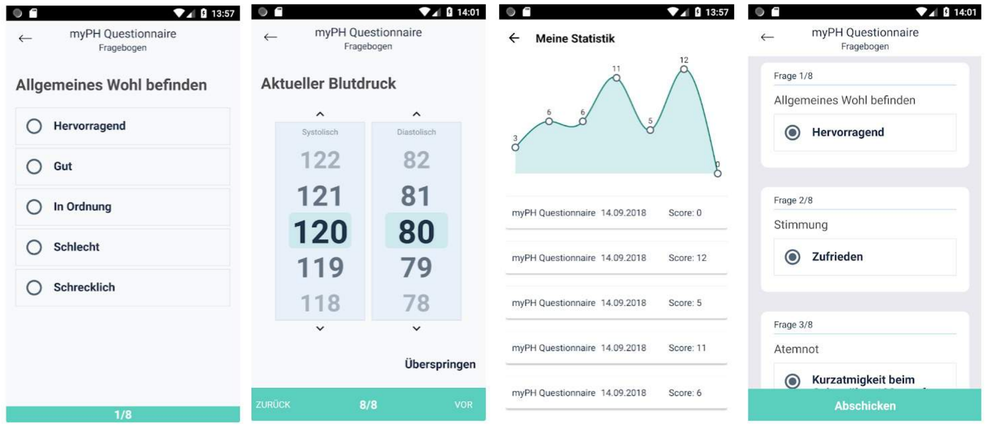


HCP – PT communication	Sensor & tracking

myPH | MERCK

2 Facilitate PT – HCP communication by collecting survey results from PH PTs and share with their HCPs; HCP monitors disease and adherence.

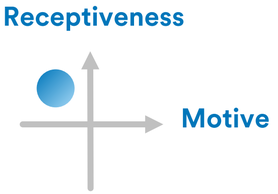
RESPIRATORY



[1] LivingWith™ – cancer management app [source]

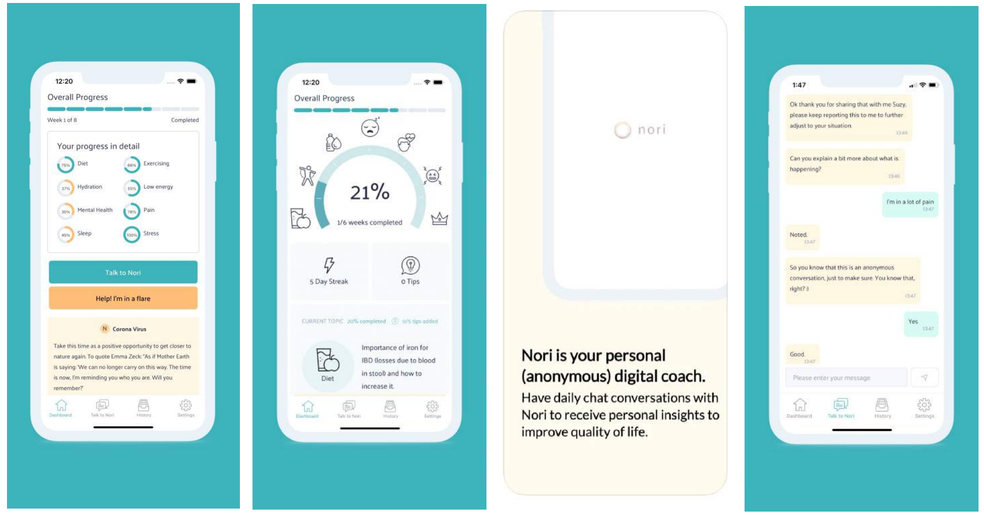
[2] MyPH – app for patients with pulmonary hypertension and their doctors. [source]

Competitor case studies by patient segments

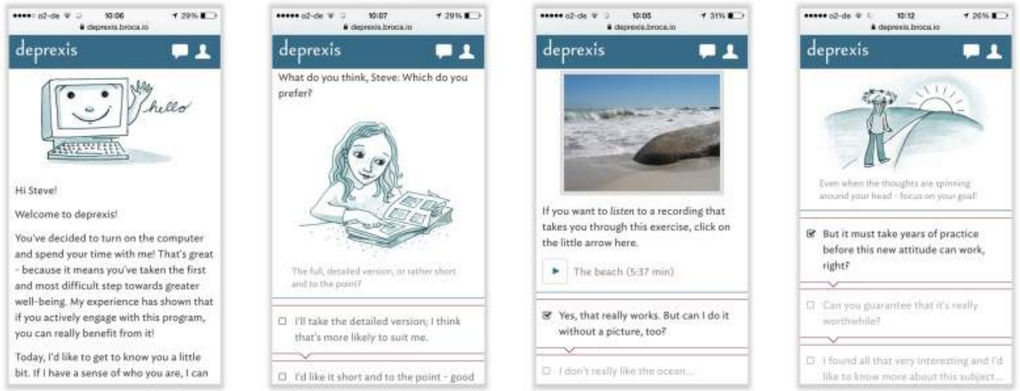


High Receptiveness, Low Motive

Emerging HC solution	Sensor & tracking
nori	nori HEALTH
1 Crohn's & Colitis Management (6-week program) AI chatbot that provides feedback and collects patient data; gamified to engage users.	IMMUNOLOGY



Awareness/Info	Patient support
deprexis®	orexo
2 AI-based simulated dialogue using Cognitive Behavioural Therapy (CBT) and other techniques tailored to individual PT needs capabilities (on top of treatment)	NEUROSCIENCE



[1] Nori Health – Evidence-based digital therapies for people living with inflammatory conditions. For improving quality of life and decreasing symptoms such as fatigue, pain, and anxiety. [source]

[2] Deprexis – Online digital therapy [source]