HealthNet Homecare

Complementing the Impact & Economic Potential of Patient Support Programs through Artificial Intelligence (AI) Augmentation

Joshua Hinton, London School of Economics
London, United Kingdom, j.d.Hinton@lse.ac.uk

HealthNet Homecare

- This research was funded by HealthNet Homecare, one of the UK's largest Patient Support Program (PSP) providers

What are PSPs?

- PSPs are intended to be wraparound services to aid patient adherence and improve outcomes over time.
  - They typically focus on education and encouragement (largely targeted at accountability and training) to improve patient adherence.
  - They can also include financial and clinical support, dependent on where they're delivered.
- Patient Support Programmes (PSPs) have been shown to reduce therapy drop-off rates in chronic diseases (as a proxy for non-adherence).
  - It's believed that PSPs provide adherence improvements in 90% of patients[1].
- Our study will be using therapy drop-off rate as a proxy for non-adherence.
  - Only patients who requested that their treatment was put on hold, or stopped engaging with their healthcare provider were used.
  - Those who dropped off due to changes in services, finishing a service, adverse effects, or death were not included.

[1] IQVIA (2021)

Some Examples

Medication adherence alerts; SMS reminders

Follow-up touchpoints (virtual or phone calls) at predetermined intervals to support sustained confidence and competence with medicine management

Dedicated patient support through an App that can track symptoms, provide push notifications and personalized planners, thus making for **improved patient experience and medication adherence**

Disease Assessment Scoring (e.g., PASI, DLQI, EASI, Colitis Activity Score, Harvey Bradshaw activity score, VAS, QoL etc.) as well as **Patient Satisfaction Surveys**

Patient Motivation Assessments to help drive personalised patient support. This also encompasses Goal setting and Motivational Coaching for the patient

Medication Adherence

- Measuring whether the patient is taking the required amount of medication, in the correct way, under the recommendations provided by their healthcare professional.
- Common measurements of adherence:
  - Objective: observation and biomarkers.
  - Subjective (digital): trackers, cameras, apps, MEMS
  - Subjective (analogue): MPR, PDC, self-report, questionnaires, self-report, diaries.
- Simply put, it's a minefield.
- It's thought that nearly 50% of chronic disease patients globally do not adhere to their medication[1].

[1]Sabaté & Sabaté (2003)

Adherence: Is this an untapped market?

- Not at all. The first mentions of medication non-adherence dates as far back as 450BC, when Hipprocrates stated;
  - *"the physician should keep aware that patients often lie when they state that they have taken certain medicines".*
- The market is growing rapidly, as shown in Fig 1.
- Fig 2 shows how the number of publications on non-adherence has increased roughly fourfold since 2000.
- By 2021, there were approximately 200 new mHealth products released every ***day.***[1]

Fig 1

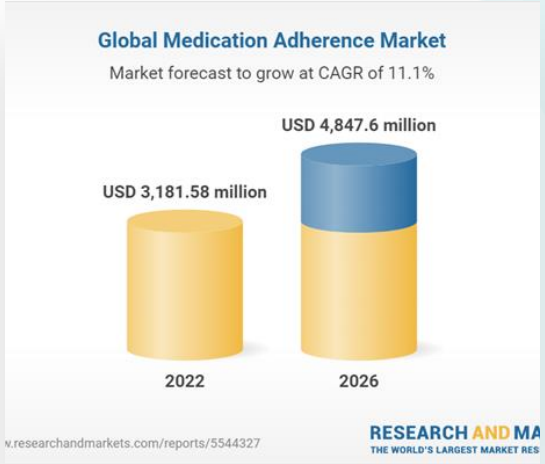
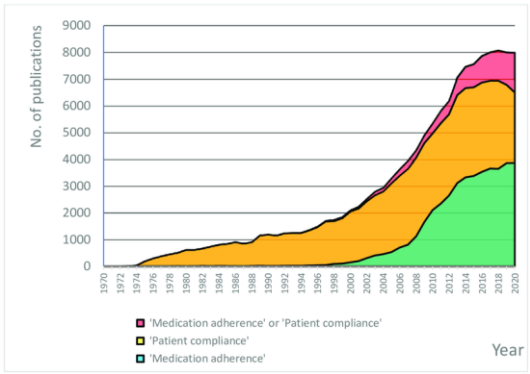


Fig 2



[1]eHealth Suisse (2021)

Drivers of Non-adherence

- Rates vary across conditions, with non-adherence being a multi-faceted problem with individual, disease, system, and sociodemographic factors contributing to its prevalence.
- Non an exhaustive list – idiosyncrasies can exist between individuals which aren't captured by anything observable. Sometimes, people make decisions and behave in a way which cannot be captured through rationality.

Sub-Group	Factor
Social/Economic	Wealth, education, language competency, age, proximity to treatment
Systemic	Clinician relationship, system capacity, consultation length, medication retrieval methods
Disease-specific	Symptom severity, disease progression, co-morbidities, physical capability
Therapy-specific	Drug regimen complexity, treatment duration, side-effects, changes to therapy, history of effective treatment
Patient-related factors	Mental health, motivation, knowledge/education, expectations, forgetfulness, identity

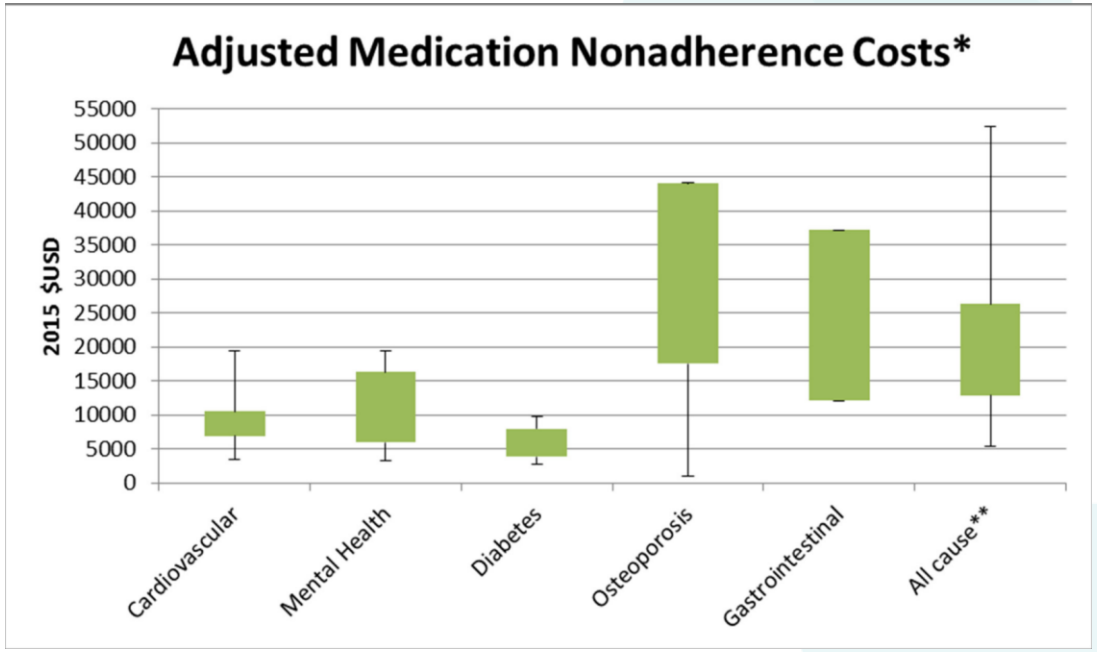
Why is it a problem?

- Almost half of all adults and 8% of children globally have a chronic condition[1].
- Around 10% of hospitalisations are predicted to be due to non-adherence[2].
- ‘Good’ adherence associated with 21% lower all-cause mortality[3].
- Thought to cause 100,000 preventable deaths globally per year[4].
- Treatments aren’t necessarily finding ‘cures’, but ways to translate life-threatening conditions in the short-term into less acutely threatening conditions, with longer term management required.

[1]CDC (2016), [2]Sokol et al. (2005), [3]Walsh et al. (2019), [4]Kleinsinger (2018)

Economic Implications of Non-adherence

- Aggregate estimates vary massively from €1bn in the EU to $290b in the US[1] (for health systems).
- Estimates of the cost to the global pharmaceutical industry of non-adherence is $564bn[3].
- Individualised estimates are much more reliable – with yearly estimated costs of non-adherence ranging from $700 to $53,000, dependent on condition.
- NHS estimates that the cost of non-adherence across just 5 conditions is £930m per annum[2].



*Cutler et al. (2018)

[1]PGEU (2008) & New England Healthcare Institute (2009), [2]Horne et al. (2006), [3]Capgemini (2011)

So? What are our objectives?

- Ultimately, we want fewer patients to drop off service.
- Keeping patients on service:
  - Minimises mortality.
  - Reduces hospitalisations.
  - Maximises patient outcomes.
- The primary objectives of clinical optimisation will always be patient-centric. If it doesn't benefit the patient, it ***shouldn't be done.***
- The additional benefit here is financial. By incentivising the private sector to behave proactively, through revenue maximisation, we can generate improvements in patient outcomes, minimise burden on national health systems, and minimise the number of chronic conditions in primary care (emergency departments, GP appointments, pharmacy advice etc.)

[1] IQVIA (2021)

What does it look like?

- Within our sample (n=97,795)[1], there are 3 possible service levels:
  1. Level 1: Direct-to-patient delivery of medication at a frequency dictated by their prescription.
  2. Level 2: Level 1 + nurse-led training for correctly self-administering their medication
  3. Level 3: Level 2 + PSP

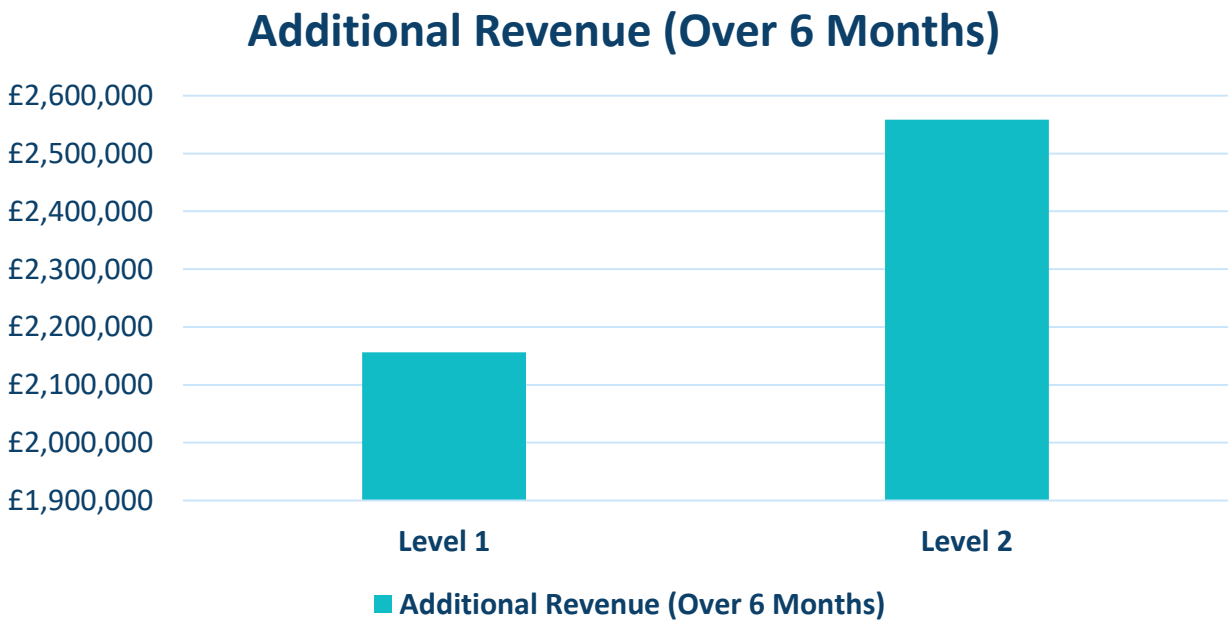
Service Level	Treatment Drop Off
Level 1	2.8%
Level 2	2.1%
Level 3	1.1%

- Positive relationship between service level and reductions in treatment drop-off.
  - Only drop-off caused by lack of patient engagement and patients requesting the treatment was put on hold were included in our analysis.

[1] Zanni et al. (2024)

Financial Benefits

- In a scenario where patients not enrolled on PSPs become so, the results would be as follows:
  - Enrolling Level 1 patients on PSPs would result in additional revenue for pharmaceutical manufacturers of £2,156,561 over 6 months as a result of decreased drop-off rates (n=613).
  - For Level 2 patients who become enrolled on PSPs, the additional revenue would be £2,558,226 over 6 months. (n=497)
  - **This additional revenue generated by reduced treatment drop-offs would have been generated only from 1,109 patients staying on service for an additional 6 months.**



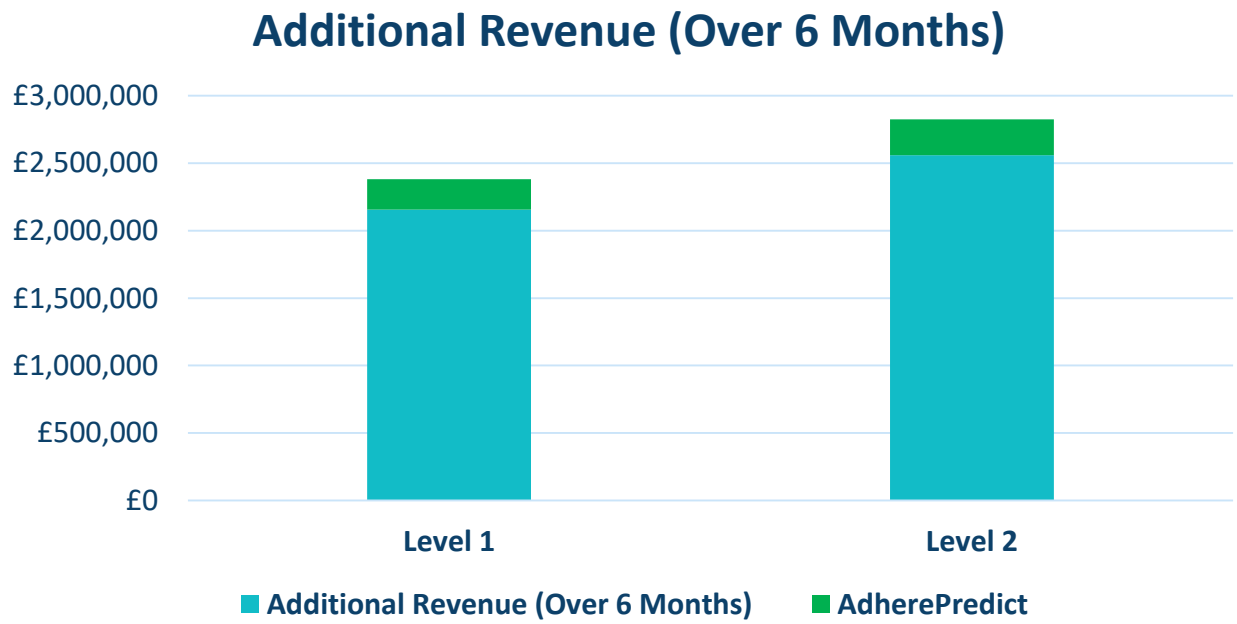
Room for more?

- We built an AI Prediction Platform, which looks to predict the patients at highest risk of dropping off their treatment[1].
  - This is a clinician-facing platform, aimed to reduce clinician burden by allowing them to allocate their time in the most efficient manner.
- By identifying these patients prior to their non-adherent period, the early adoption of PSPs can be encouraged.
- The early deployment of PSPs will reduce treatment drop-off by a minimum of 0.2%.[2]
  - We have evidence that the adoption of PSPs (at all) will reduce treatment drop-off by 1.7%. By using a *very* conservative estimate based on commercial evidence and the literature, we use the assumption that early adoption of PSPs in patients currently on Levels 1 and 2 services would reduce drop-off rate by a further 0.2%.
  - This is a conservative assumption.

[1] Malin et al. (2023) & HealthNet Homecare (2023), [2]Patel (2021) & Stuurman-Bieze et al. (2014)

Financial Benefits – Early deployment

- In a scenario where patients not enrolled on an AI augmented-PSPs become so, the results would be as follows:
  - Enrolling Level 1 patients on PSPs would result in additional revenue for pharmaceutical manufacturers of £225,000 over 6 months.
  - For Level 2 patients who become enrolled on Level 3 services, the additional revenue would be £282,000 over 6 months.
  - **It's worth keeping in mind that this additional revenue is generated from keeping only an additional 332 patients on service for 6 months.**



Implications - Systemic

- 31 million people in the UK are living with at least 1 long term health condition.[1]
- A naïve approach would consider the revenue generation capability of each patient that did not drop off from our sample.
- This approach finds that the 6-month revenue generation capability of a patient would near £1,500.
- Many therapies are not as complex; we consider only subcutaneous injectables for this study which typically have a higher cost.
- However, the NHS currently spends around 70% of its budget on care for people with chronic disease[2].
  - We know how costly non-adherence is – anything which helps to reduce this burden should be explored further.

[1]ONS (2020), [2]Nuffield Trust (2024)

Closing Thoughts

- PSPs are great for:
  - Reducing treatment drop-off
  - Tailoring treatment to the individual
  - Improving adherence whilst on treatment
- However, they can be greater. We believe that any low-cost models which can encourage the early adoption of PSPs and reduce treatment drop-off rates can have transformative effects on health systems globally.

HealthNet Homecare

Any questions?

Thank you