



Patient-Provider Communication Technologies, Patient Preferences and Medication Adherence: An In-depth Analysis

Ben Malin, Brunel University London
London, United Kingdom, ben.malin@brunel.ac.uk



Declarations

- This research was funded by HealthNet Homecare, one of the UK's largest Patient Support Program (PSP) providers
- The company utilizes market-leading technological solutions to streamline Clinical Homecare & Direct-to-Patient Delivery services
- Patients are referred to the services from NHS Secondary Care Hospitals and generally are diagnosed with long-term conditions



Medication Adherence

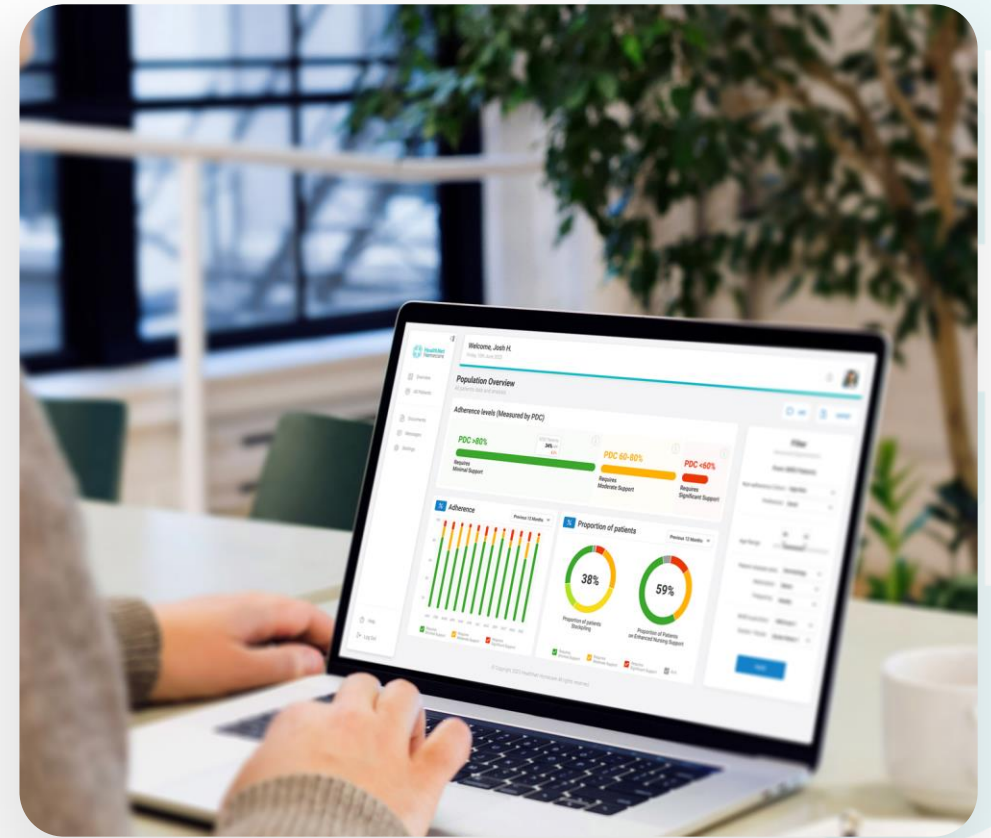
- Adherence is a measure of how reliably a patient takes their medication
- Challenges associated with tackling adherence are both enormous and well-documented
- Common approaches for measuring adherence
 - Proportion of Days Covered by medication (PDC)
 - Medication stock-based measure – how many days does the patient have stock for?
 - 80% of days covered by the stock is typically used
 - Adherence questionnaires
 - Less objective, but still common
 - Patient reported adherence scores
- PDC is the metric of choice by various healthcare bodies¹



[1] D. Prieto-Merino *et al.*, “Estimating proportion of days covered (PDC) using real-world online medicine suppliers’ datasets,” *J Pharm Policy Pract*, vol. 14, no. 1, Dec. 2021, pp.1-14, doi: 10.1186/s40545-021-00385-w

Aims

- Increase the adherence of our patients
 - Improving patient health outcomes
 - Reducing economic burden
 - Through utilisation of our adherence prediction CNN²
- Improve clinician's efficiency
 - Simplifying patient data
 - Assisting them in making judgements for the level of support required by patients
 - Optimising the allocation of resources
- Identify the importance of patient-provider communications
 - How they relate to adherence



[2] B. Malin, T. Kalganova, E. Nwokoro, and J. Hinton, Medication Adherence Prediction for Homecare Patients, Using Medication Delivery Data. IARIA, 2023. Accessed: Jan. 12, 2024. [Online]. Available: https://www.thinkmind.org/index.php?view=article&articleid=healthinfo_2023_1_60_80027

Communications

- Patient-provider communications are necessitated to confirm a medication delivery for homecare
 - Phone calls
 - Emails
 - Online portal
- Other studies have correlated either the importance of communications with adherence (such as digital reminders) ³, or for the presence of communication preferences ⁴
- When patient's join this homecare service, their preferences for communication channels are gathered

Communication channel	Initial Preference	Total Successful Uses
Portal	24,976	125,065
Calls	3,597	178,974
Emails	8,171	1,067

[3] P. J. Cvietusa et al., “Digital Communication Technology: Does Offering a Choice of Modality Improve Medication Adherence and Outcomes in a Persistent Asthma Population?” Perm J, vol. 25, pp. 20–189, 2020, doi: 10.7812/TPP/20.189.

[4] S. M. McPhail, M. Schippers, C. A. Maher, and A. L. Marshall, “Patient Preferences for Receiving Remote Communication Support for Lifestyle Physical Activity Behaviour Change: The Perspective of Patients with Musculoskeletal Disorders from Three Hospital Services,” Biomed Res Int, vol. 2015, 2015, doi: 10.1155/2015/390352.

Research Questions

- Does the channel of communication used influence patient adherence?
- How dynamic are patient communication preferences
- Does inconsistency in communication preference influence patient adherence?



Does the channel of communication used influence patient adherence?

- We performed panel regressions with every patient's monthly adherence (PDC) as the outcome variable. Providing multiple observations per patient.
 - Both panels regress the communication channel used for delivery confirmation
 - Panel 2 includes covariates, such as diagnosis, age and gender
 - To minimise omitted variable bias
- Portal users have adherence that is 6.6-6.8% higher in any given month than call users
- Email users have adherence that is 9.2-11% higher than portal users
 - Likely due to the unidirectionality and comparably few instances within the data sample

Variable	Panel 1		Panel 2	
	Coefficient	Std. Error	Coefficient	Std. Error
Call	-6.67%***	0.00116	-6.80%***	0.00127
Email	9.24%***	0.000660	11.0%***	0.00242
# Observations	285,621		230,687	
# Patients	28,311		23,820	

Outcome variable Monthly PDC: Panel 1 regresses monthly communication type (Portal=omitted category) and Panel 2 includes covariates age, gender, IMD, PES and diagnosis (*** p<0.01, **p<0.05, *p<0.1).

How dynamic are patient communication preferences?

- Logistic regression analysis performed, using a patient's length of time on the service with the communication channel that they use to confirm their deliveries
- Each additional month a patient is on service:
 - Portal use increases by 4.7%
 - Phone call use decreases by 4.6%
 - Email use decreases by 46.7%
- Email use decrease linked to new patients who haven't provided alternative means of communications yet
- Portal use increasing with time is a positive finding
 - Linked to higher adherence
 - Shows greater engagement with treatment than being the recipient of a phone call

Communication Channel	Odds ratio ⁺ (Std. error)
Portal	1.047*** (0.000326)
Call	0.954*** (0.000236)
Email	0.533*** (0.0106)

Communication type is recorded every month, with a maximum of one communication type per month. This communication type corresponds to the generation of a successful delivery. (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).⁺ (OR

Does inconsistency in communication preference influence patient adherence?

- Monthly panel regression conducted
- When a patient uses a communication channel that was stated as an initial preference:
 - Their adherence (PDC) is likely 6.1-6.3% greater than patients who deviate from this preference
- Panel 4 includes previously mentioned covariates
- These findings can aid clinicians, as well as the proposed dashboard
 - Improving adherence prediction confidence through understanding of communication consistency

Variable	Panel 3		Panel 4	
	Coefficient	Std. Error	Coefficient	Std. Error
Consistent Preferences	6.11%***	0.00118	6.32%***	0.00130
# Observations	285,621		230,687	
# Patients	28,311		23,820	

Panel regression models with random effects. Outcome variable: Monthly PDC. Panel 3 regresses monthly preference consistency (consistent=1, inconsistent=0) and Panel 4 includes covariates age, gender, IMD, PES, and diagnosis (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).

Conclusion

- Communication channel used influences adherence
 - Portal users have $\approx 6.7\%$ greater adherence than phone call users
- Communication channels used are dynamic
 - As length of time on service increases, the use of an online portal increases too
 - 4.7% increased use month on month
- Patients that stick to their initial communication preferences have greater adherence
 - In a given month, if they confirm a delivery via their initial preference then their adherence is likely to be $\approx 6.2\%$ higher
- These findings allow greater understanding of patient behavioural patterns
 - Enabling more efficient allocation of resources, allowing for greater adherence
 - Aiding our goal of a patient dashboard, to benefit both clinician's and patients



Any questions?

Thank you