an Aptar pharma company

APPLYING CONNECTIVITY TO ENHANCE THE TRAINING STANDARD OF CARE FOR SELF-INJECTING DRUG DELIVERY DEVICES

In this article, Erin Miller, Marketing Co-ordinator at Noble, looks at how connectivity can be used to enhance training to help address the challenges of accuracy and non-adherence when patients self-inject their medications.

The Internet of Things (IoT) and connected devices have transformed our everyday lives, from web-connected televisions and smart kitchen appliances to fitness trackers and home security systems. Similarly, connected medical devices are poised to revolutionise healthcare and drug delivery.

The medical technology industry designs and manufactures more than 500,000 different types of medical devices – including wearable external devices, such as insulin pumps and blood glucose monitors, and implanted medical devices, including pacemakers and defibrillators. These devices have proven instrumental in helping the healthcare industry achieve better patient outcomes and lower healthcare costs – and create new ways to engage and empower patients.[1]

THE INTERNET OF MEDICAL THINGS

This vast number of connected medical devices has given rise to the Internet of Medical Things (IoMT). Think of it as a connected digital health ecosystem of stakeholders that includes medical device companies, original equipment manufacturers, healthcare IT systems, networking technologies and end users that, together, can remotely connect patients to their healthcare providers (HCPs) and transfer medical-grade data over a secure network.

The in-home segment of the IoMT market includes personal emergency response systems (PERSs), remote patient monitoring (RPM) and telehealth virtual visits. RPM comprises all home monitoring devices and sensors used for chronic disease management, which involves continuous monitoring of physiological parameters to support long-term care in a patient's home in an effort to slow disease progression; acute home monitoring, for continuous observation of discharged patients to accelerate recovery time and prevent re-hospitalisation; and medication management, to provide users with medication reminders and dosing information to improve adherence and outcomes.[2]

> "Nearly half of patients who self-inject receive no training on how to do so properly."

BENEFITS OF IoMT AND CONNECTED MEDICAL DEVICES

Connected medical devices and IoMT applications represent the future of healthcare for patients, pharmaceutical

Erin Miller
Marketing Co-ordinator
T: +1 888 933 5646 ext 180
E: emiller@gonoble.com

Noble
121 South Orange Avenue
Suite 1070
Orlando
FL 32801
United States

www.gonoble.com

companies and HCPs, playing a vital role in the remote tracking and treatment of chronic illnesses and delivering a range of benefits that include improved drug management, enriched patient experiences and enhanced patient outcomes. Connected devices also create market differentiation and enable value-based contracting.

> "When training is incorporated into the standard of care, patients experience significant improvement in their performance. They become more confident and less likely to abandon their treatment."

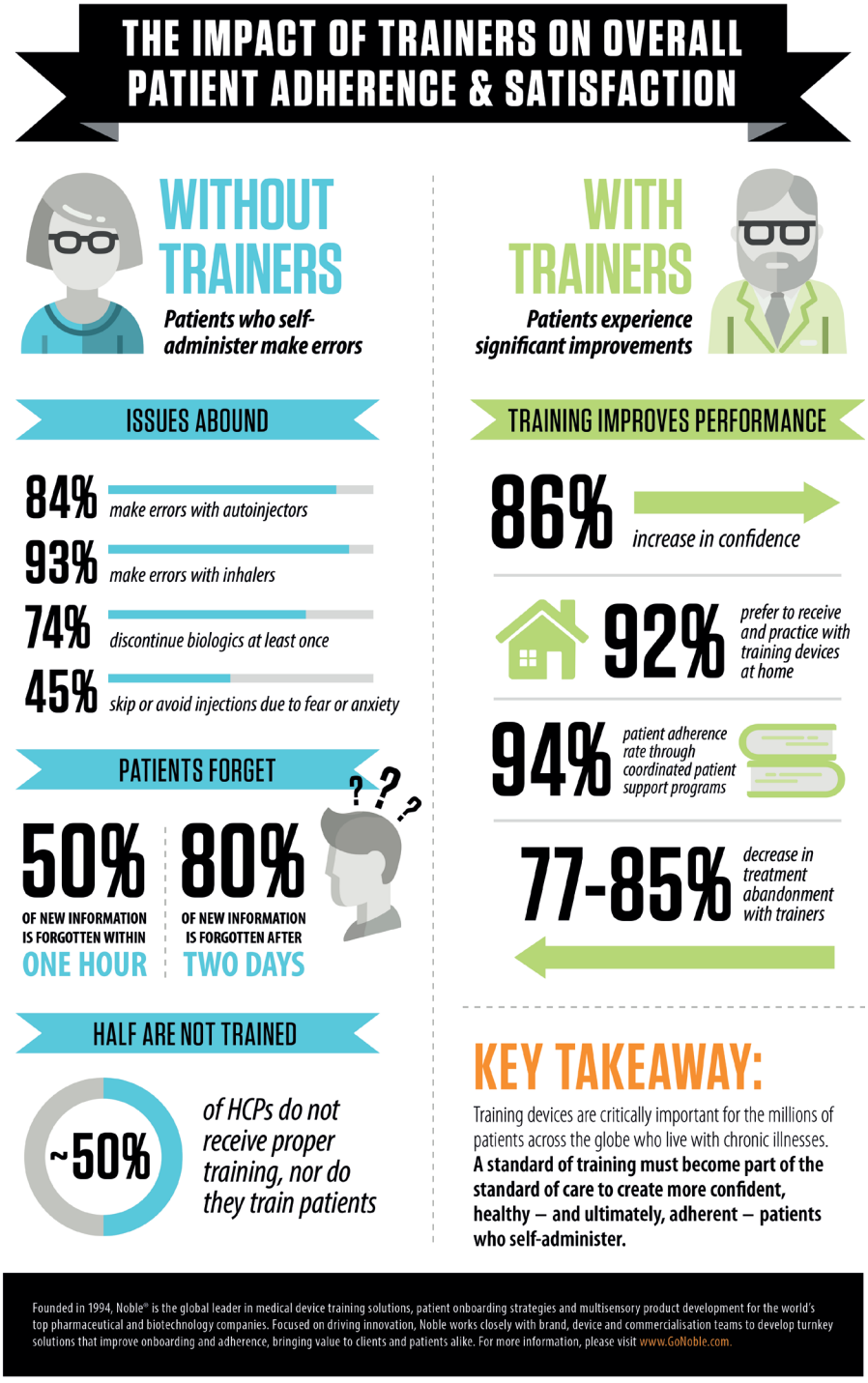

Figure 1: Patient statistics with and without training devices as support.

The potential of connected medical and drug delivery devices to help control healthcare costs and increase patient access to care is supported by an October 2019 study of trends in remote patient monitoring. It revealed that 88% of surveyed providers are investing in RPM solutions as a clinically effective, early symptom management tool to remotely monitor unstable, high-risk patients with chronic conditions which, in turn, supports value-based care implementation.[3]

THE INJECTABLES SEGMENT OF IN-HOME MEDICAL DEVICES

When it comes to the injectables segment of in-home medical devices – which includes autoinjectors and prefilled syringes – patient adherence and satisfaction have long been common concerns due to the lack of adequate training. These concerns are especially true for patients with chronic conditions such as arthritis, diabetes, Crohn's disease and multiple sclerosis who must self-inject their own medication.

Nearly half of patients who self-inject receive no training on how to do so properly, according to a recent study conducted by Noble, an Aptar Pharma company, which explored the impact of trainers on overall patient adherence and satisfaction. The study revealed numerous issues when patients self-inject their medications without training:

- 84% make errors when using their autoinjector devices
- 74% discontinue their biologic medication at least once
- 45% skip or avoid their injections due to fear or anxiety.

Conversely, when training is incorporated into the standard of care, patients experience significant improvement in their performance. They become more confident and less likely to abandon their treatment. The findings of Noble's study include (Figure 1):

- 86% increase in patient confidence when self-injecting their medication
- 92% of patients prefer to receive and practise with training devices at home
- 94% patient adherence through co-ordinated patient support programmes
- 77–85% decrease in treatment abandonment with trainers.

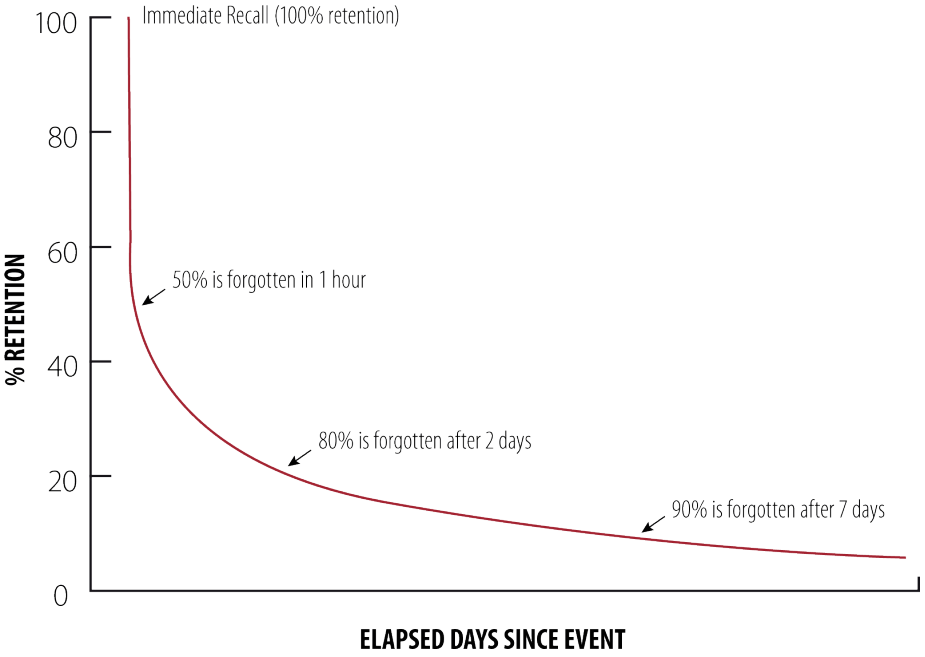

Figure 2: The forgetting curve theory.

Compounding this situation is the growing acceptance of telemedicine as a safe and convenient alternative to the traditional methods of care delivery, prompted by the COVID-19 pandemic. A national survey conducted in mid-March 2020 explored how Americans perceive telehealth in the new era of coronavirus and how it might impact their approach to telehealth in the future. Nearly 60% of respondents indicated that COVID-19 made them more likely to consider using telehealth services in the future. Yet more than 40% expressed concerns about the ability to get proper treatment or diagnosis in a virtual setting.[4]

IMPACT OF THE FORGETTING CURVE

A significant factor in the high percentage of device usage errors reported in the Noble study is the low rate at which patients retain information that their HCPs provide when prescribing self-injecting medications. Working against these patients is the forgetting curve theory that suggests retention and recall degrade over time without practise and repetition. This theory hypothesises that 50% of new information is forgotten within one hour, 80% is forgotten after two days and an astounding 90% is forgotten in a week (Figure 2).[5]

As biologics become more advanced and require less frequent dosing, the longer downtime between injections allows for non-adherent patient behaviours to arise. This is especially troublesome for patients who are tasked with self-injecting without the support of an HCP or demonstration device week after week throughout their therapy.

THE COST OF NON-ADHERENCE

In addition to the human cost of non-adherence on patient outcomes, there is also a significant business cost to the life science industry. Pharmaceutical companies lose US$637 billion (£518 billion) in revenue annually due to non-adherence to medications for the treatment of chronic conditions, according to a research paper co-authored with Capgemini and HealthPrize Technologies. Boosting adherence can provide unparalleled benefits to both patients and shareholders.[6] While the lost revenue is significant to pharmaceutical companies, it does not capture the full financial impact of non-adherence as it does not account for lost revenue to insurance companies and time and expenses incurred by HCPs.

HealthPrize Chief Executive Officer Tom Kottler called medication nonadherence the "final frontier", where pharmaceutical companies can simultaneously generate significant top- and bottom-line growth, improve outcomes and create substantial savings for the healthcare system. Mr Kottler added, "While pharmaceutical companies have historically focused on the physician as their customer, with the consumerisation of healthcare and a focus on bringing products to market to treat more complicated chronic conditions with smaller patient populations, more attention needs to be paid to patients and their behaviours that could improve outcomes and reduce health care expenses."

APPLYING DEVICE CONNECTIVITY TO TRAINING STANDARD OF CARE

Noble has long been an industry leader in the development of training devices and onboarding solutions for patients living with chronic illnesses who self-administer their drug therapies. The company manufactures autoinjectors, prefilled syringes and on-body, nasal and respiratory trainers that mimic the exact feel, force and function of true drug delivery devices.

These training devices take on even greater importance as in-home and self-managed care become more routine. Incorporating connectivity into the process can further improve adherence and confidence by:

1. Providing an augmented training experience with highly relevant and personalised content
2. Empowering the patient with interactive feedback to help guide them through the injection experience
3. Refining follow-up training and intervention based on user data.

Currently, Noble is in the early-stage development of a connected, intuitive and user-friendly training solution – called AdhereIT – for patients who self-inject using an autoinjector. It combines an autoinjecting drug delivery device with information technology to improve adherence and create a more engaging experience for patients who self-administer their prescribed therapeutic treatments.

AdhereIT is a reusable integrated device that pairs autoinjectors used by patients for at-home drug delivery to a software application via Bluetooth technology to provide immediate feedback about whether the injection was performed correctly. The training platform also allows HCPs to monitor their patients' therapeutic performance via a dashboard and provides biopharmaceutical companies with valuable non-patient-specific adherence behaviour information.

HOW THE NOBLE DEVICE WORKS

Patients face heightened anxiety during their first biologic injection and every time the next injection approaches.[7] AdhereIT allows patients to regain control of their therapy

regimen while easing the anxiety associated with self-injecting.

AdhereIT works with either an autoinjector training device or actual drug delivery device to detect the beginning and end of an injection session. Users place the AdhereIT device on the injection site and insert the autoinjector. Once the injection begins, the AdhereIT light will "breathe" green followed by two green bursts to signal that the injection is completed. AdhereIT will "breathe" red when a wet injection occurs, indicating that the user removed the autoinjector before the full dose was delivered (Figure 3).

Noble's design features clear, easy-to-understand visuals and haptic feedback, including:

- Real-time feedback to train users on correct self-injection
- Data that is stored and wirelessly sent to a mobile app
- A standalone design that does not need to be incorporated into the drug delivery system.

CONCLUSION

Training devices are critically important for the millions of patients across the globe who live with chronic illnesses. A standard of training must become part of the standard of care to create more confident, healthy – and ultimately, adherent – patients who self-administer their medications.

Connected drug delivery devices can support this standard of care and improve patient health outcomes by addressing the challenges of accuracy and non-adherence. This is a compelling value proposition for all stakeholders – patients, care providers, pharma companies and payers.

ABOUT THE COMPANY

Noble is focused on fostering healthy patient outcomes for those who self-administer drug therapies, through the development of robust training devices and onboarding solutions for the world's top pharma brands and biotech companies. Noble manufactures and commercialises training devices that mimic the exact feel, force and function of drug delivery devices such as autoinjectors, prefilled syringes, on-body, nasal and pulmonary devices in order to increase patient adherence and confidence and decrease usage errors. Noble is an Aptar Pharma company, which is part of AptarGroup, Inc. (NYSE:ATR).

Figure 3: Noble's AdhereIT 360 base with novel packaging.

REFERENCES

1. *"Medtech and the Internet of Medical Things: How connected medical devices are transforming health care". Deloitte, July 2018.*
2. *"Internet of Medical Things Revolutionizing Healthcare". The Alliance of Advanced Biomedical Engineering, 2017.*
3. *"Healthcare without Bounds: Trends in Remote Patient Monitoring 2019". Spyglass Consulting Group, October 2019.*
4. *"Americans' Perceptions of Telehealth in the Era of COVID-19". Sykes, March 2020.*
5. *"Brain Science: The Forgetting Curve – the Dirty Secret of Corporate Training". Learning Solutions, March 2014.*
6. *"Pharmaceutical Companies Lose $637 Billion in Revenue Annually Due to Medication Nonadherence". Press Release, HealthPrize Technologies, Nov 16, 2016.*
7. *Doshi J, Takeshita J, Pinto L, Li P, Yu X, Rao P et al "Biologic therapy adherence, discontinuation, switching, and restarting among patients with psoriasis in the US Medicare population". J Am Acad Dermatol, 2016, Vol 74, pp 1057–1065.*

ABOUT THE AUTHOR

Erin Miller, Marketing Co-ordinator at Noble, an Aptar Pharma company, supports marketing and advertising efforts at Noble through copywriting and editing as well as content creation for Noble's print and digital communications platforms. She holds a bachelor's and master's degree in public relations.

A new way to connect with patients.

The AdhereIT® solution offers design flexibility to accommodate various autoinjector platforms. This allows for greater speed to market and lower development costs.

AdhereIT® enables brands to:

Track product usage to offer insights into patient behavior and better meet their needs.

Reduce costs by improving patient adherence, helping patients stay on therapy longer.

Strengthen patient loyalty through engagement and education via phone app.

Improve patient therapeutic experience through device features and app-based tools and resources.

ADHEREIT
360 CLIP*

ADHEREIT
360 BASE

* Conceptual design

AdhereIT®
ADHERENCE. INFORMATION. TECHNOLOGY.

A connected solution to improve patient adherence.

Learn more: **GoNoble.com/Connected**

noble®
an Aptar pharma company