

# Portal Instruments

## AN INJECTION OF CONNECTED NEEDLE-FREE INNOVATION

In this article, Barb Taylor, Senior Director of Marketing at Portal Instruments, discusses the next generation of needle-free injection devices.

It's that time of year again – turkey feasts, holiday songs, festive parties... and the flu! While I am a strong believer in all vaccinations, I will secretly admit that sometimes the kids (due to their anxiety, fear and complaining) win and we skip the flu jab. But this year, with my parents' health not 100%, the flu shot was non-negotiable.

As we sat in the waiting room at the paediatric clinic, my kids naturally brought up my work and asked when they could get a needle-free shot from Portal. The nurse, who was fast and efficient but looking



Figure 1: Flu vaccine time.

rather harried, overheard us and asked if it worked. The quick answer is yes, it works. But you can't get the shot (or the injector) for your own use from Portal – it will be distributed through our pharma partners as part of a combination device with an approved drug.

The nurse continued to recount a tale I have heard many a time. The anticipation of the injection is usually worse than the actual shot (Figure 1). But that fear can often be debilitating and the difference between a successful vaccination and an unsuccessful one. She guessed that 5-10% of patients don't come in for the influenza vaccine because of the struggle and anxiety of having to get a shot. A 2012 paper by Taddio *et al*<sup>1</sup> shows her guess is not far off – a survey of parents (n = 883) and children (n = 1024) found that “altogether, 24% of parents and 63% of children reported a fear of needles. Needle fear was the primary reason for immunisation non-compliance for 7% and 8% of parents and children, respectively.” I am not alone.

“Portal is reinventing needle-free drug delivery with technology that is substantially different from any other needle-free injector that has been on the market.”



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**Computer Controlled:** The closed-loop control system allows for the device to adjust the speed of the jet in order to deliver drugs with different properties to the correct tissue depth.

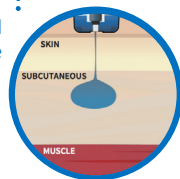
**Digitally Connected:** Adherence data is seamlessly collected.

**Cartridge:** Single-use cartridge can be disposed with general waste.



**Jet Stream:** Through a computer-controlled jet stream, Prime quietly administers the drug subcutaneously.

- **Volume:** Up to 1.2 ml
- **Speed:** <0.5 seconds
- **Viscosity:** 60 cP+



“With data and analysis, teams will be able to identify challenges related to adherence, predict trends in patient populations, and use that data to create a better patient experience.”

technology that is substantially different from any other needle-free injector that has been on the market.

Here’s the long answer as to what that means and how Portal is different – Portal Instruments is modernising drug delivery by using novel, electromechanical technology to deliver and track injections, needle-free and automatically. Portal’s injector, called Prime (Figure 2), administers the drug through a highly pressurised, computer-controlled jet stream. The narrow jet pierces through the epidermis and delivers the drug into the subcutaneous space (Figure 3).

This is different from mechanical needle-free injectors as Prime’s computer-controlled motor and internal feedback control system work together to sense the pressure and adjust the velocity of the jet stream accordingly. This results in a very quick injection (<0.5 seconds) even at high volumes (1 mL) and high viscosities (tested up to 60 cP).

Figure 2: The Prime device offers next-generation, connected needle-free drug delivery.

**PORTAL PRIME DEVICE – NEXT-GENERATION NEEDLE-FREE**

“The Prime needle-free device logs all injections and can be automatically connected to patient apps or physician records.”

Our nurse continued to tell another story of nasal spray flu vaccines and other needle-free injectors she had seen over her career – and her ambivalence towards them. My quick answer was that Portal Instruments is reinventing needle-free drug delivery with

**CONNECTIVITY & ANALYSIS TO DRIVE OUTCOMES**

As with most next-generation technologies, the Prime needle-free device logs all injections

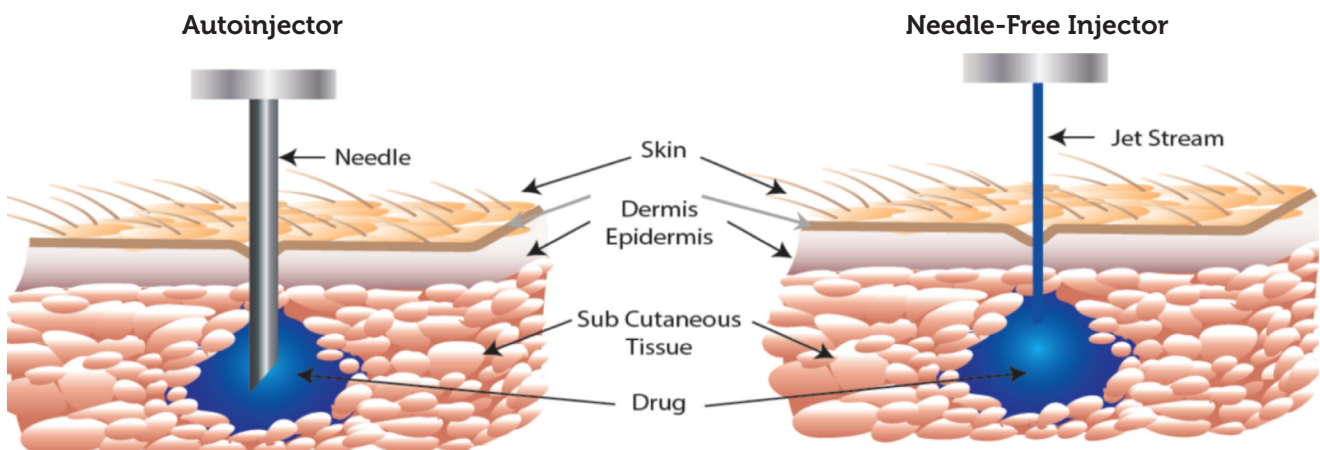


Figure 3: Conventional needle-based injection from an autoinjector (left), compared with needle-free injection (right) where a high-pressure, narrow jet pierces through the epidermis, delivering drug into the subcutaneous space.

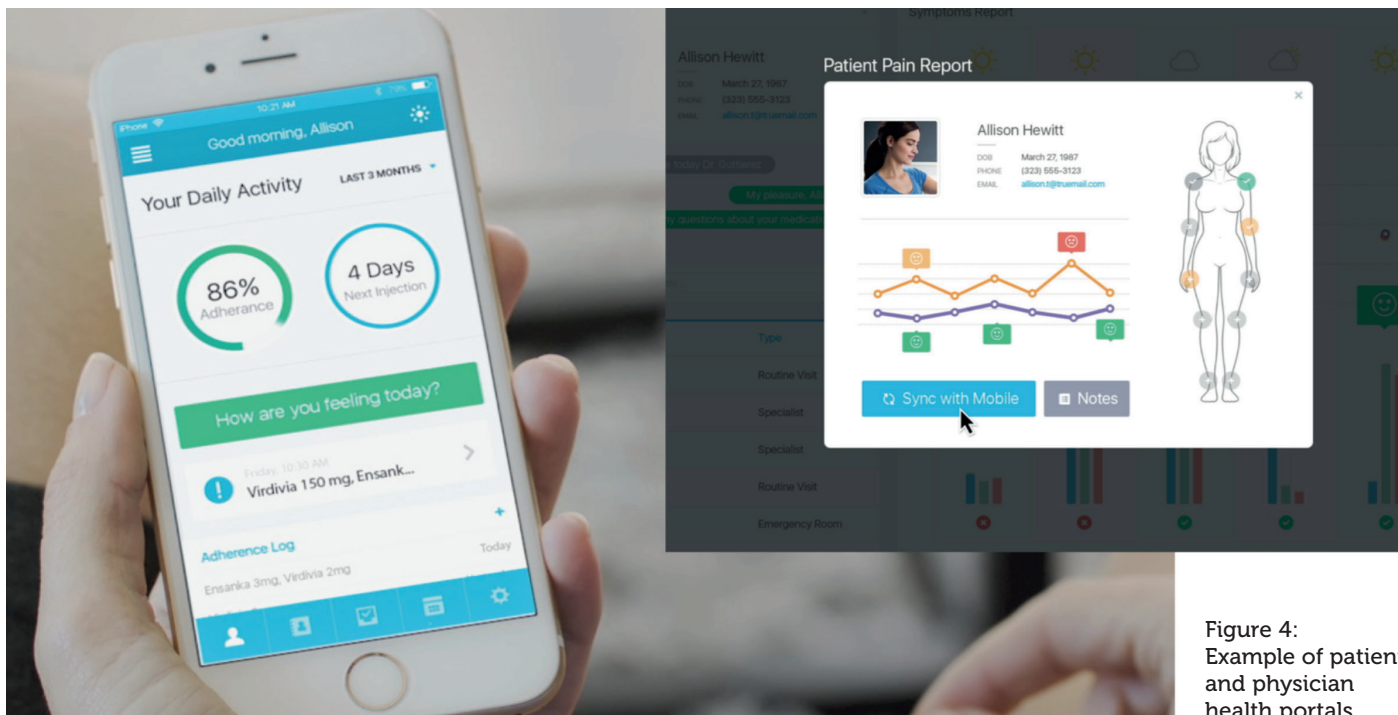


Figure 4: Example of patient and physician health portals.

“Our vision is that connectivity within the injector will empower patients to have better control over their treatments.”

and can be automatically connected to patient apps or physician records (Figure 4).

Portal’s vision is for this data to provide real-time adherence insights which can ultimately be used by the healthcare team to drive improved adherence and better outcomes. For example:

- Pharmaceutical partners can analyse aggregated and de-identified data to enhance pharma lifecycle management and use the quantitative insights to launch specific, targeted campaigns to drive population penetration and adherence programmes.
- Patient service providers can quickly identify “late doses” before they become “missed doses” and be proactive in reaching out to patients who may need support.
- Payers could use this adherence data to inform value-based contracts that are dependent on adherence.

With data and analysis, teams will be able to identify challenges related to adherence, predict trends in patient populations, and use that data to create a better patient experience. Trends that were previously undetected may become noticeable.

Likewise, our vision is that connectivity within the injector will empower patients

to have better control over their treatments. Patients can track their injections and other variables to improve their ability to self-manage their disease. If patients share their data feeds with caregivers or family members, those family members can remotely and non-intrusively check to make sure the medication was taken on time and offer support if needed. Patients may choose to share injection and self-reported data with their physicians in order to have a more well-rounded picture of their disease progression. This insight may create more efficient physician visits and more tailored treatment plans.

#### A VISION FOR THE FUTURE

While I reflect on how a needle-free vaccine would be great for my family, I cannot

help but think of patients who need to have injections monthly, weekly or daily. In this season of thanks and reflections, I am indeed grateful for the many advances in pharma therapies and drug delivery devices that can improve, empower and ease the journey for patients.

#### ABOUT THE COMPANY

Portal Instruments is a clinical-stage connected drug delivery firm, commercialising a next-generation needle-free drug delivery platform to transform the drug delivery experience for patients suffering from chronic diseases such as ulcerative colitis, multiple sclerosis, rheumatoid arthritis and psoriasis.

#### REFERENCES

1. Taddio A et al, “Survey of the prevalence of immunization non-compliance due to needle fears in children and adults”. *Vaccine*, 2012, Vol 30 (32), pp 4807–4812.

#### ABOUT THE AUTHOR

**Barbara Taylor** leads the marketing team at Portal Instruments. With more than 20 years’ experience in health tech strategy and marketing, she brings to Portal expertise in healthcare software development, new product introduction, lifecycle and service strategy, and business model innovation. Prior to Portal Instruments, Ms Taylor was at a number of large and small firms including Philips Healthcare and Mercer Management Consulting. She holds an MBA from the Kellogg Graduate School in Evanston (IL, USA) and a BS in biology from the University of Michigan in Ann Arbor (MI, USA).

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