



## EMBRACING THE FUTURE: CONNECTED DRUG DELIVERY SOLUTIONS

SHL Group explore the opportunities that the advance of digital health can bring to pharma companies, using a connected device solution, which includes autoinjector Molly® C and the Recording Unit (RU), to illustrate how connectivity can improve adherence to medication, and ensure patients' lifestyle and quality of life is improved.

To be at the forefront of the healthcare industry, pharmaceutical, biotech, medical and manufacturing companies must take into account existing trends and needs. However, they must also be able to look into the future and anticipate the factors likely to change healthcare.

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One such factor is the advance of digital health. The use of wearable sensors, mHealth applications, telehealth, big data and other digital technologies will become even more widespread in the not-too-distant future. This shift is inherently connected with a change in lifestyle and attitudes. By 2020, there will be six billion smartphone users, so mobile technologies are likely to predominate over landlines or desktop computers.<sup>1</sup>

Improvements in global lifestyle and income will also bring about more

awareness of personal health outcomes – leading patients to become even more discriminate consumers. At the same time, it is reported that healthcare costs are rising so fast that they might become unaffordable by mid-century,<sup>2</sup> leading payers increasingly to insist on value-based outcomes in the healthcare market. All of these changes are happening in the looming shadow of an ageing population and chronic disease epidemic.

What can be done to equip drug delivery devices for these new needs? What solution could accommodate higher lifestyle demands and cost reduction imperatives by supporting remote treatment, for example? To answer that, we need to look at the technology standing at the intersection of stakeholders' demands and technological supply – connectivity.

### CONNECTIVITY AND ADHERENCE

Connectivity is enabled by incorporating electronics and firmware into the device. A modified autoinjector, for example, can use wireless connection options to connect with users' mobile devices to transfer and store information about drug delivery. When information is saved to the application there are various possibilities for sharing it with different interested parties (Figure 1).

Use of the app, however, is not limited to just delivery data management. Additional in-app functions might include targeted information and training videos, contact with healthcare professionals, frequently

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asked questions, as well as automated reminders, and more.

Importantly, connected delivery devices support adherence to medication. The growing prevalence of chronic diseases means that more people need to receive their medication on a regular basis. Non-adherence creates unnecessary suffering for patients and avoidable costs for healthcare organisations and pharma companies.

Nevertheless, low adherence remains one of the biggest problems for chronic disease patients. Further, some new-generation biologics only need to be administered weekly, bi-weekly or monthly. The rarity of injections, being beneficial for patients in terms of quality of life, on the other hand, leads to problems in creating and maintaining a stable regimen.

Connectivity can solve these problems by helping patients and other stakeholders to keep track of injection data, and identifying patients who need additional support. Moreover, in-app training courses and notifications will educate and remind patients about the process, thus helping to avoid non-compliance due to forgetfulness and difficulty of administration.

### VALUE ADDED ON EVERY LEVEL

The availability of smart technology has led to a proliferation of connected devices. However, the purpose of medical devices is to satisfy the needs of stakeholders. That's why it is so important that connectivity should add value on every level. Patients could be the primary beneficiaries of connected devices. Improved adherence will certainly increase their wellbeing, but that's not the only benefit. Availability of instructions, reminders, records and advice at one's fingertips will make in-home care much more convenient, thus improving patients' lifestyle and quality of life.

In-home care will also reduce the burden of healthcare professionals. In addition, they will appreciate faster and easier monitoring and communication with patients that comes with connected devices.

The shift to value-based compensation means that payers are looking for cost-reducing innovations that will also permit monitoring of the outcomes. Connectivity allows just that by enabling patients to share the information with different interested parties. Consequently, payers will have the opportunity to monitor, assist and reward compliance.

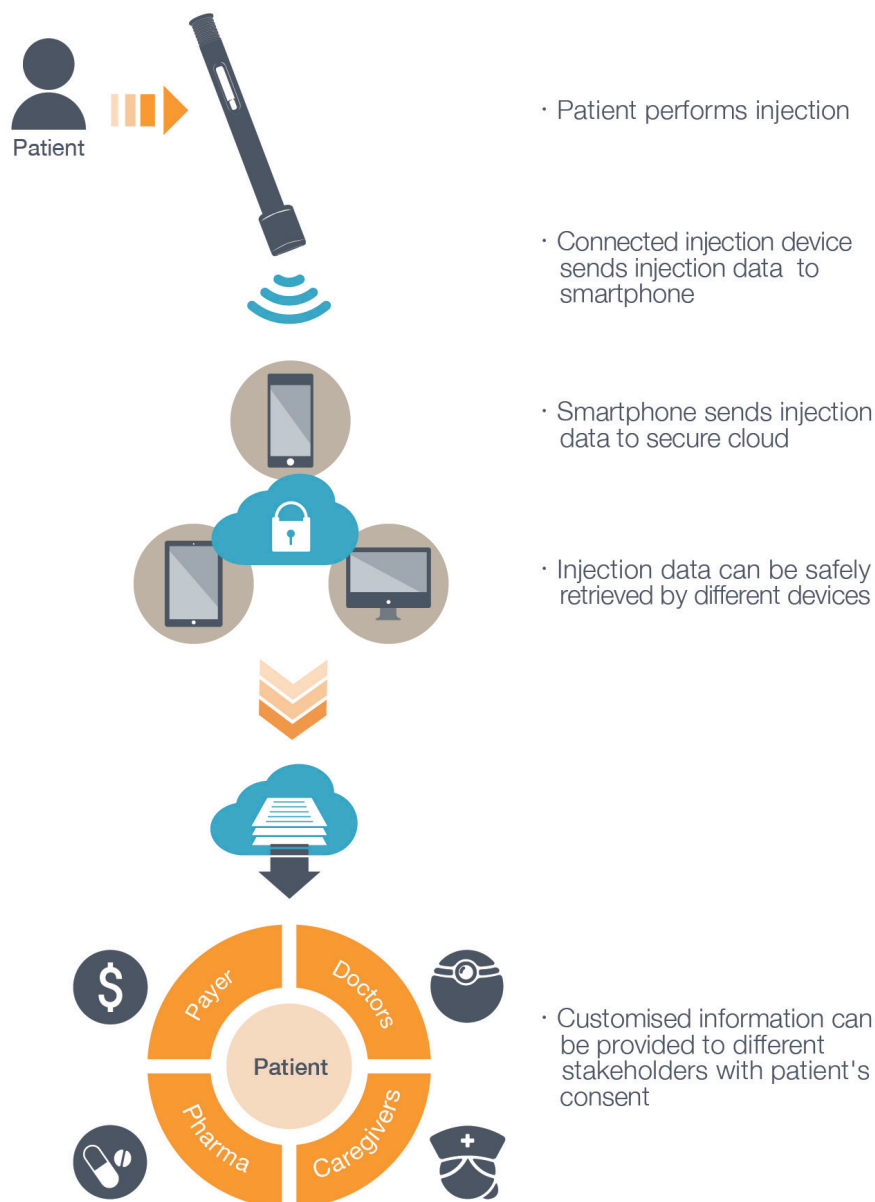


Figure 1: The concept of connectivity.

Finally, pharma companies will not only save money due to improved adherence by patients, but the brand differentiation that comes with connectivity will also be vital for drug lifecycle management. This will be because it can be used to ensure greater product acceptance and the ability to stand out in the sea of different drug options. Moreover, the availability of real-world data from patients could be put to a wide range of uses from clinical trials to development of new and better products.

### MOLLY® C AND MOLLY® RU

To demonstrate the opportunities opened up by connectivity, SHL introduced the Alubena® program dedicated to connected device solutions.

The concept of Molly® C and RU,

developed under the auspices of Alubena®, shows the possibilities of a connected autoinjector. Molly® is a trusted and reliable device platform that has proven its efficiency, functionality and adaptability to different customer needs. The autoinjector itself is disposable, but the recording unit (RU) is reusable for two years without charging. It uses Bluetooth technology to transmit information to a user's mobile device (Figure 2).

The hybrid design combines the advantages of disposable autoinjector and reusable sensor and transmitter, giving remote recording capabilities in a very cost effective way. The RU and autoinjector are easily attached through proprietary interface. Distinctive audible and visual confirmation of the connection is given at every use (Figure 3). For the user, injection

is the same easy two-step operation as with Molly® RNS device; but he or she also receives RU's indication of the completion of the process and saving of the data (Figure 4).

Essentially, Molly® C and the RU concept incorporates compactness, robust design, user-friendly interface and the functionality of previous Molly® devices, while at the same time increasing the range of options for the patients, carers and other stakeholders. The simple inject-save-share process does not require any extra effort from the patient, yet it not only helps to improve adherence, but also ensures permanent access to injection history for further use.

### CONNECTIVITY AS CAPABILITY

Molly® C and RU is just one example of what the SHL Connectivity program – Alubena® – can offer. There are many further uses for connected devices that will differ from customer to customer.

Connectivity as capability could be used in supply-chain management, for example, by allowing tracking of the drug from production to end-user in order to verify quality and authenticity. Environmental recording solutions would ensure that the product has been handled within its allowed margins all the way down to the patient. Finally, connected delivery devices might further integrate into healthcare infrastructure by connecting and exchanging information with pharmacy networks and database-driven health records.

According to research, difficulty of administration process accounts for about 50% of non-adherence among chronic disease patients. Possibilities of in-app teaching through multi-lingual training method and graphic interface will give patients and carers learning opportunities they've never had before.

Finally, the advance of digital health means that there will be even further opportunities to integrate drug delivery devices into the broader healthcare network. Connectivity as a device capability will allow users to share their data instantly as well as connect with social networks, support groups and healthcare providers. Collection and analysis of big data will improve research and development, and lifecycle management for pharmaceutical companies, while permitting payers to monitor, analyse and motivate value-based outcomes. Integrated, connected solutions will bring about faster, better and more affordable healthcare.



Figure 2: Molly® C and the recording unit (RU).

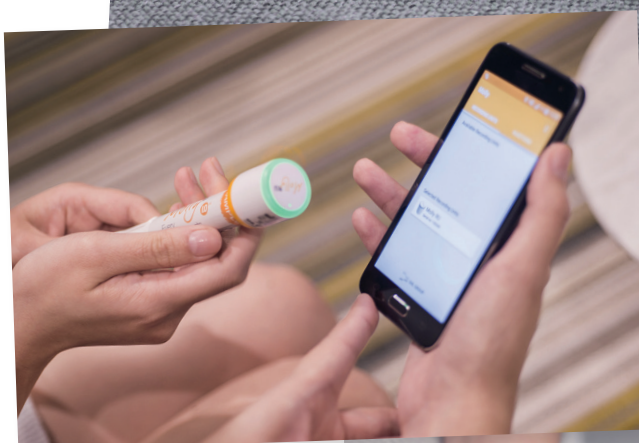


Figure 3: RU connects to the mobile device, and provides audio and visual confirmation of the connection.

### PREPARING FOR THE FUTURE

The future of healthcare is digital. To avoid missing out on the new opportunities, pharmaceutical and biotech companies must prepare for the new era. Bearing in mind that adherence to medication will only grow in importance; adding connectivity, as a way to support it, is one of the most obvious choices. It is important to choose an experienced partner, because efficient partnership with the device manufacturer is essential to the success of the product.

SHL, being one of the leading advanced drug delivery device manufacturers in the world, has a unique insight into the needs of stakeholders and the core functions of devices that can accommodate those. Extensive market experience together with an innovative approach make SHL opportunely placed to develop robust solutions in the field of connectivity. We are always looking out for leading-edge technologies to incorporate into our devices. At the same time we think it's important not to be carried away by what contemporary technologies offer us and



Figure 4: The injection process is the same easy two-step operation.

always keep in mind usability, efficiency and safety of the product.

In conclusion, developing a smart connected product in partnership with an experienced and trusted manufacturer is a timely and probably necessary step for pharma and biotechnology companies, and SHL is extremely well-suited to be such a partner.

### REFERENCES

1. Ericsson, "Ericsson Mobility Report", June 2015, <http://www.ericsson.com/mobility-report>
2. OECD, "Healthcare costs unsustainable in advanced economies without reform", September 2015. <http://www.oecd.org/health/healthcarecostsunsustainableinadvancedeconomieswithoutreform.htm>





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