



Smart pharma solutions save lives

NFC enables effective medication delivery



Costly and potentially dangerous

Many patients worldwide fail to adhere to their medical therapy. On average, non-adherence rates range from 30% up to 60%, with 50% of all patients undergoing long-term treatment failing to take their medication as prescribed. These are serious numbers.

A report released by the World Health Organisation (WHO) in 2010 stated that an increase in adherence would likely be a bigger benefit to global health than advances in specialized medicine. It also underlined that the cost of this negligence in the US alone is \$280 billion yearly, and that number is rising. What is even more concerning is that non-adherence can lead to further complications, hospitalization or even death. The same WHO report estimates that non-adherence to medication results in over 125.000 deaths annually in the US.

What is the problem?

So why do patients not stick to their regimens? According to a 2011 study by Marie T. Brown, MD and Jennifer K. Bussell, MD, there are many reasons. Some of the main ones include:

- Simple forgetfulness
- A complex regimen
- Delayed or side effects
- Old age
- Disappearance of symptoms

- Poor communication between physician and patient
- Lack of adherence data
- Quality and content of instructions

As can be seen, there are many factors that can influence medication-taking behaviour. Some can be directly attributed to the patient, but others also involve the physician and the overall process. As a result, responsibility cannot be put solely on the patient. This is where smart pharma solutions can help ease the burden. Better yet, smart solutions allow for the distribution of responsibility across the whole process chain and can aid everyone involved.

Smart packaging helps everyone

Addressing this issue, NXP has introduced all the tools you need for successful adherence management. By combining NFC-enabled smart medicine containers with a smart device app, many of the significant challenges can be dealt with in an elegant, intuitive way.

Even better, connecting the app to the cloud empowers medical staff to deliver more qualitative care, and aid patients remotely. Complete adherence management solutions also enable the automatic logging of reliable, factual information for every individual patient. By comparing the data from multiple patients, new insights can be gained to further improve patient care.



Patient benefits

- ▶ Easily follow complex regimens
- ▶ Can check correct dosage to take
- ▶ Receive better instructions through app
- ▶ Gain feedback about therapy adherence
- ▶ Can contact caregivers in case of doubt
- ▶ Receive automatic reminders
- ▶ Receive warnings when refills are needed

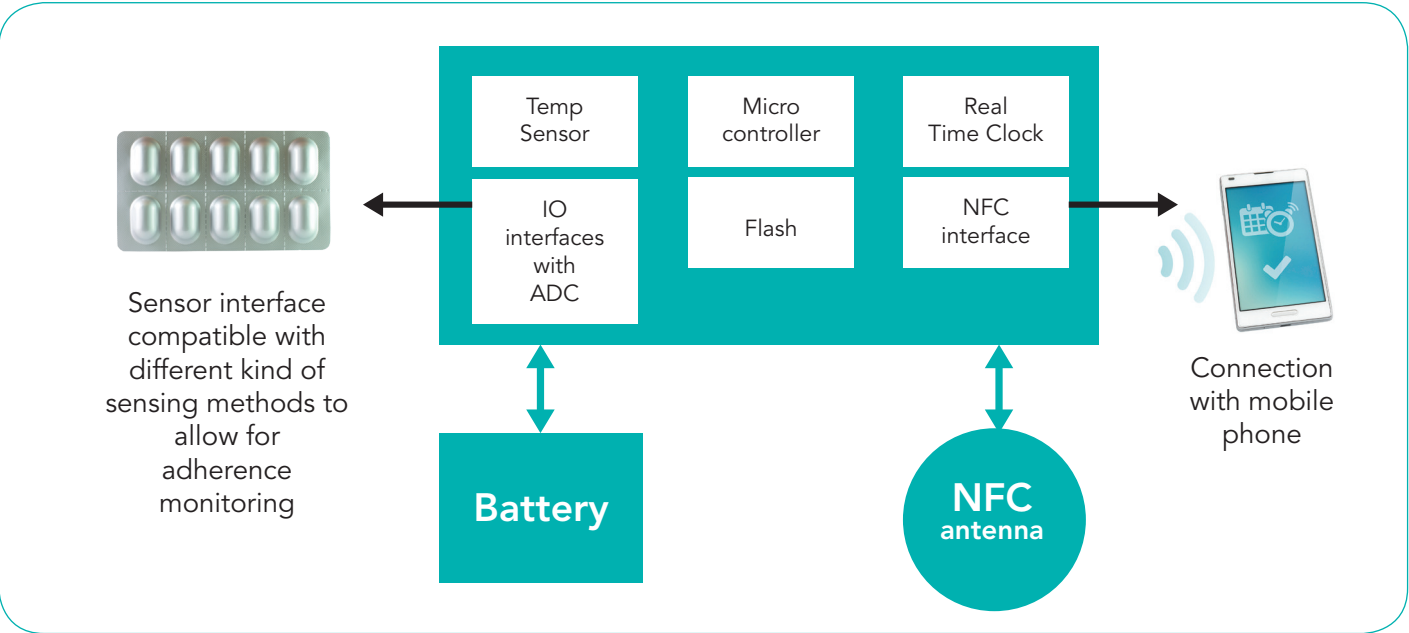
Medical staff benefits

- ▶ Gain clear insight into patient's therapy adherence
- ▶ Provide clear and unambiguous instructions through app
- ▶ Receive feedback on any unexpected drug side effects
- ▶ Easily adapt therapy program to individual patient's needs
- ▶ Can be contacted by patients with questions about therapy
- ▶ Easy integration with electronic patient records



NXP solution: The compliance Logger

A fully integrated single chip solution



Package compliance monitoring processor

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|-----------------------------|---|
| Optimized for event logging | Multiple event detection mechanisms (resistive capacitive or GPIO) Event control (pin-change or wake-up) |
| Flexible | Customer-programmable ARM Cortex M0+ processor industry class ARM development tools |
| Low power | Battery start enabling via NFC (extends shelf life) Over-the-air powered (NFC) |
| Highly integrated | Embedded non-volatile data logging storage (up to 32KB) No crystal |
| Interfaces | NFC for readout and parameter writing and power GPIO pins for visual feedback (e.g. LED) SPI and I ² C |

