

# NEEDLE-FREE

## Alternative technologies reduce need to needle stock.

by Kaci Foraker, editorial intern

**N**eedle-free injection technology (NFIT) has been around for many years and continues to advance. Vaccinating people with needle-free injections began back in the 1940s. Today, many different types of products have been developed to propel a drug through the animal's skin and offer alternative ways to deliver therapies.

The practice has been tested and used more in the swine and sheep industries, but its advantages could be welcomed by the cattle industry. In his experience as a veterinarian at Kansas State University (KSU), Dan Thomson says the practice is not typically considered in cattle operations.

### Modes of transport

The end goal of NFIT is to deliver a drug through the skin of the animal using other modes of transport than a needle. With rapid advancements in technology, there is a diverse set of products on the market that eliminate use of a needle.

Often NFIT uses compressed air, carbon dioxide or a buildup of pressure to inject the drug, while other devices may be powered by springs. Gas-powered products have a more versatile range to deliver drugs at certain depths of the skin tissue with added force. However, each type of product operates in a similar fashion, regardless of the energy source.

The injector needs to be perpendicular to the bovine's skin and the device is applied directly to the skin. With most devices, the drug will be delivered from the pressure on the nozzle once it is pushed against the skin. Keeping the device held firmly to the skin, the injection is made.

Lastly, the device simply needs to be pulled away. To prepare for the next injection, most devices will reload and recharge in a matter of seconds.

For sustained use, NFIT can typically be connected to a backpack to store a desired amount of the drug and connect to a prolonged power source. With a combined injection system that is simply carried on one's back, it's simple to move the device.

### Pros and cons

As with any newer technology, NFIT has its pluses and minuses. Eliminating the use of a needle leads to a multitude of positives, including a safer work environment and less likelihood of accidentally being stuck with a needle. Zero chance of a needle breaking off or accidentally getting lost is a large positive of NFIT.

Based on a 2008 study conducted on sheep at an animal disease research unit operated by the USDA, the inoculation of 100 wethers required 60% less time when compared to the same system using needles for injections. Less waste was also created, as needles and syringes were not discarded throughout the process.

Cutting needles out of the vaccination or drug-delivery

process is usually favored for animal welfare aspects. Though discouraged, the reuse of needles is a common practice in cattle operations, and NFIT helps create a sterile environment when working with entire herds.

"Use of needle-free injections decreases the transfer of blood-borne diseases like anaplasmosis," Thomson says. "Needle-free technology also allows [producers] to reduce the number of used needles that need disposed."

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Several universities have performed research on the effectiveness of NFIT and other implications associated with it. In a study from the University of Manitoba, a drug was administered using both needles and a needle-free unit to determine the antibody response based on delivery method. Results showed the antibody response was similar for both practices; however, there was an increase in skin irritation with NFIT.

Multiple studies have been inconclusive when analyzing whether using needles reduces injection-site lesions. Needle-free injections create a much smaller entry point, which should reduce any tearing of the skin or muscle tissues.

Josh White, executive director of producer education for the National Cattlemen's Beef

Association (NCBA), says currently there are no guidelines related to NFIT included in the Beef Quality Assurance (BQA) program.

From Thomson's use of NFIT, he notes, "It can be great technology for the beef industry. Part of the problem is that we need three or four syringes at the chute when working cattle. Plus, needle-free injectors are expensive to most operations. Also, it is difficult to use needle-free technology with larger-volume products."

Most systems can be set up to administer only one given product at a time and are not usually equipped to deliver large doses that may be needed when giving drugs like antibiotics.

Using the technology in adverse weather conditions could pose an issue, with the gas tanks or liquid freezing in the system. There have been reported cases of these situations; however, as technology advances, other solutions have solved those issues. This change of equipment could serve as a barrier for smaller operations or some that don't often give shots.

Purchasing an NFIT system could cost from \$2,500 to \$5,000. Over time that initial investment could pay off when compared to using the typical disposable needle and syringe. Yet, there's no denying that buying a disposable needle and syringe at a cost of less than \$1 each is simply more feasible for certain programs.

Though this new technology is seldom used in cattle operations currently, Thomson foresees it becoming more widely adapted. ■

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Editor's note: A student at Kansas State University, Kaci Foraker was the 2019 Angus Media summer intern.