

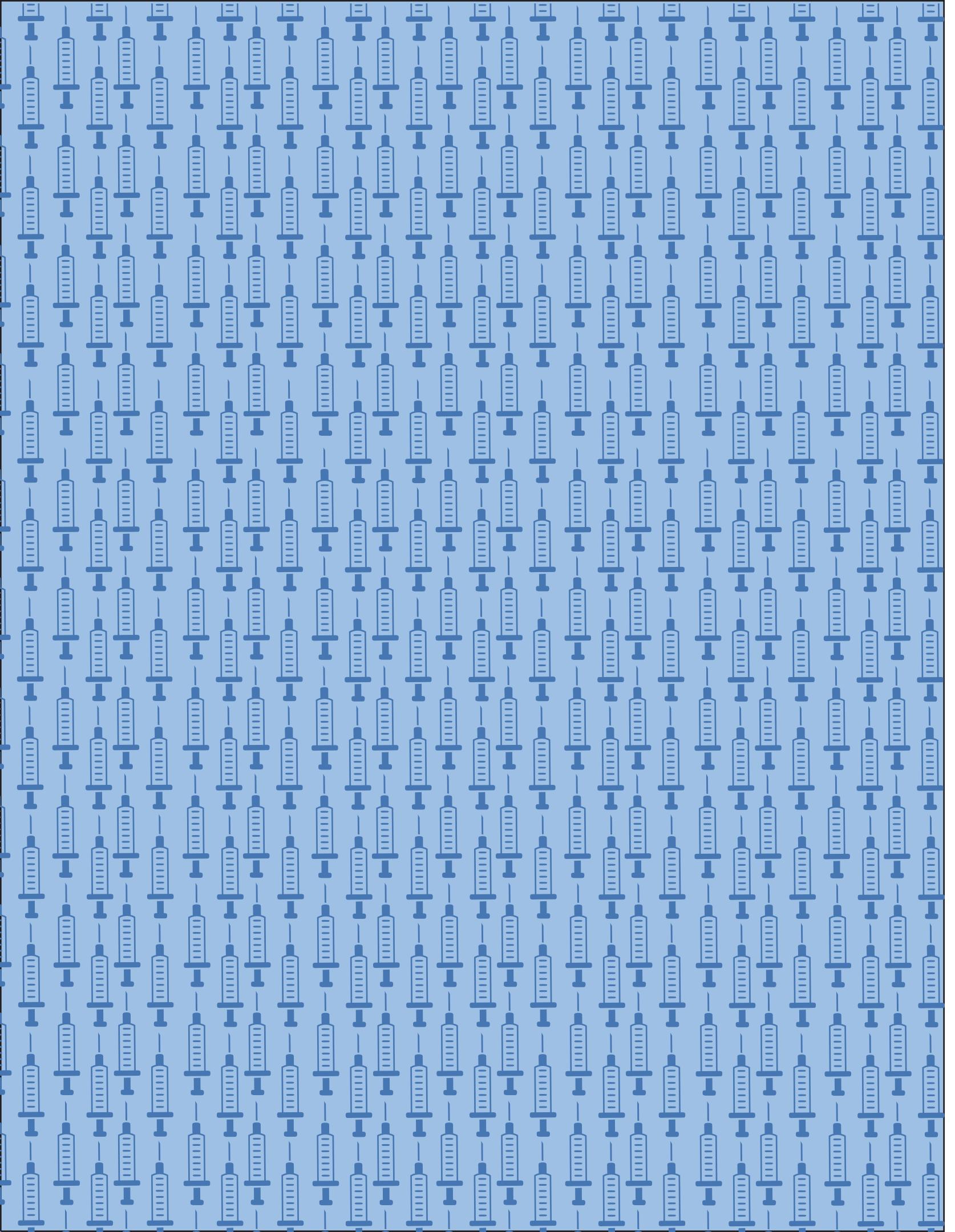
NewNeedle

a small solution to a large problem

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Parsons Product Design
Intensive 2019





In the last three decades, the opioid epidemic in America has tightly gripped the lives of Uberanites across the country, changing the dynamics of living in close quarters with millions of other individuals. The opioid epidemic is a difficult and complex issue to address. The issue is fueled by multiple communities, industries, and policies in place that make it incredibly difficult to address and remedy problems associated with the epidemic as they arise.

During the 1990s, pharmaceutical companies that oversaw opiates assured health-care providers that patients could not become addicted and therefore healthcare providers began to prescribe them at increased rates. This increase in opioid prescriptions led to widespread misuse of pills and it became clear that such medications were highly addictive.

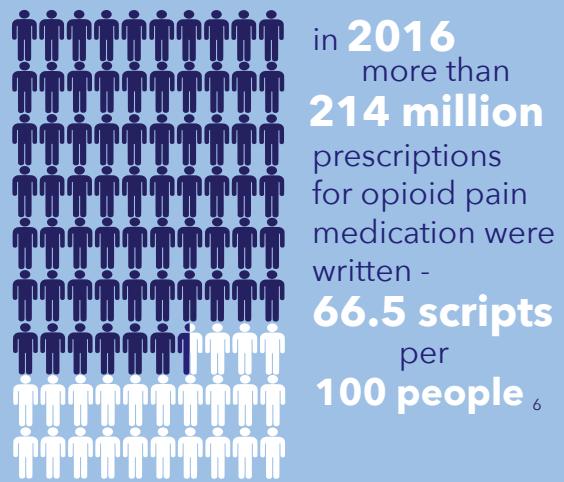
Over time the availability of prescription opioids has decreased, making it more difficult to maintain a prescription for an extended period of time. However, as this occurred the ability to acquire heroin has increased in ease and many prescription opioid users are transitioning to it due to its widespread availability and inexpensive price.

In those who use heroin, it is very common for individuals to be homeless or to have insecure housing. This phenomenon leads to more drug use occurring in public and frequently occupied areas. In turn, litter associated with intravenous drug use is left exposed such as used syringes with exposed needles. This significant public health and public safety concern is due to the bloodborne diseases that can be passed through used syringes and infect others.

What are opioids?

Opioids are a class of drugs naturally found in the opium poppy plant and that work in the brain to produce a variety of effects, including the relief of pain with many of these drugs.

11 million people abused opioid prescriptions in **2017**¹



• 78.5 billion
total economic burden of opioid misuse in the US estimated by the CDC a year¹

80%
of people who use **heroin** first misused **prescription opioids**²

Opioids can include:

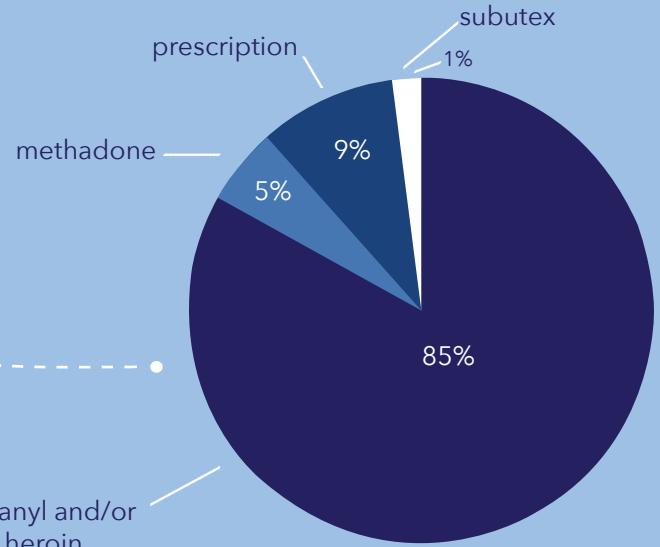


Heaviest Opioid Abuse States

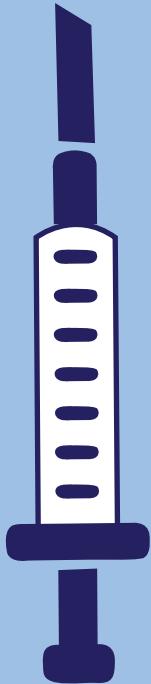
1. West Virginia
2. Ohio
3. Washington D.C.
4. New Hampshire
5. Maryland



Fatal Opioid - Related Overdoses Mutually Exclusive Toxicology Categories



Massachusetts Department of Health



13,000

exposed needles are collected every
month in San Francisco.⁵

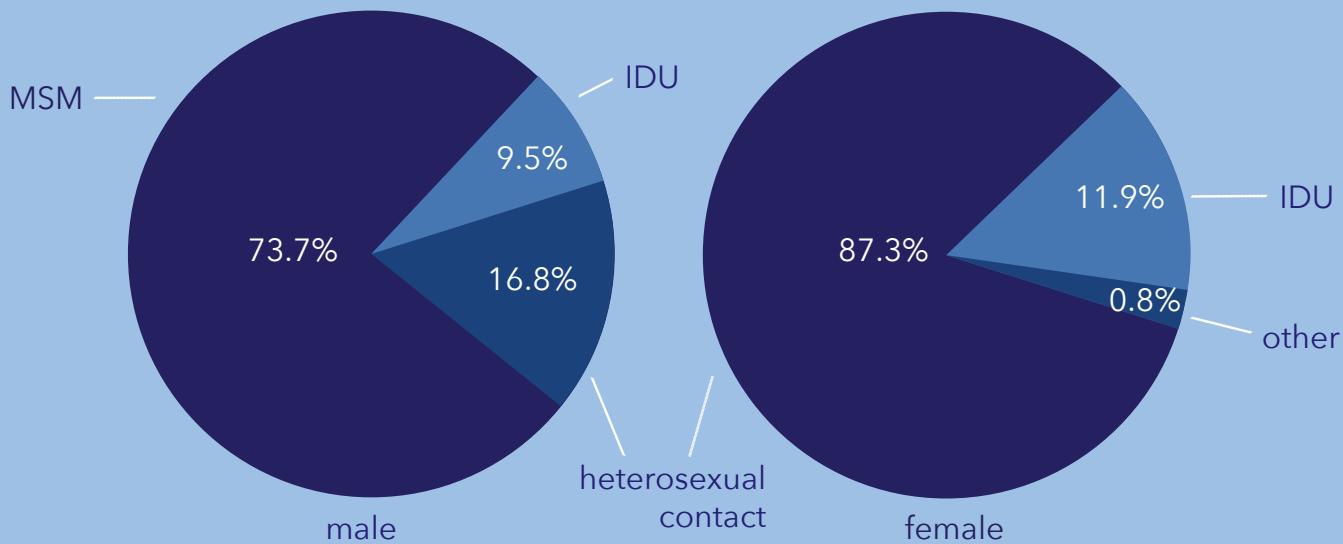
2.5 million

needle stick injuries
occur a year.⁵

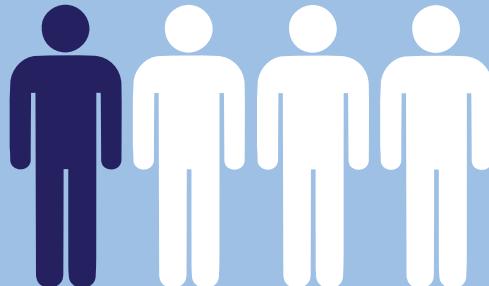
500,000

occur in public spaces.⁵

HIV Prevalence and HIV Diagnoses Attributed to Injection Drug Use (IDU)



New Jersey: percent of male vs. female with new HIV diagnoses, by transmission category, 2016.²



one in four
people use
only sterile
needles.⁴

200

needle exchange
programs exist in
33 states.¹

The issue:

Opioid prescription abuse commonly leads to heroin use for its less expensive cost and accessibility.

Heroin use is most commonly done through intravenous methods using a syringe needle, individuals often using in public.

Syringes come into contact with blood and therefore possibly and bloodborne pathogens.

Used syringes are left exposed and on the ground of public and frequently occupied spaces creating great risk and opportunity for pedestrians to be stuck or poked.

Why do people reuse needles?

Why are they given a choice to reuse needles?

How can a safety syringe be made for IDUs?

How can it maintain simplicity?

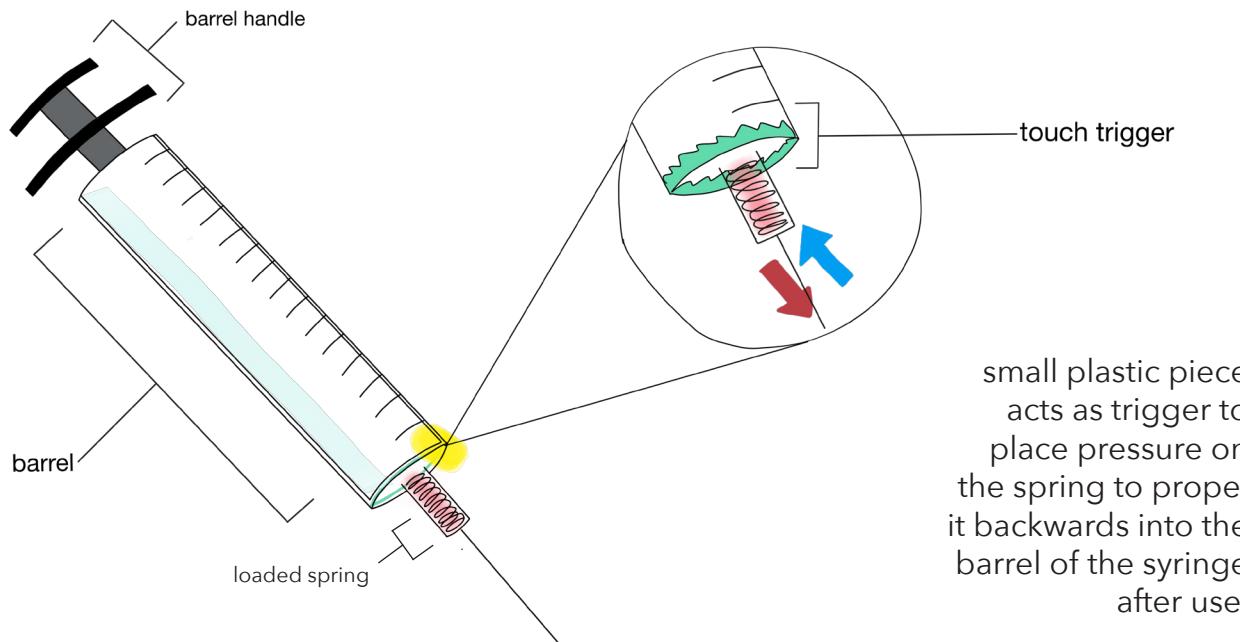
What is the cost to manufacture?

What are guidelines and rules for syringes in the medical industry?

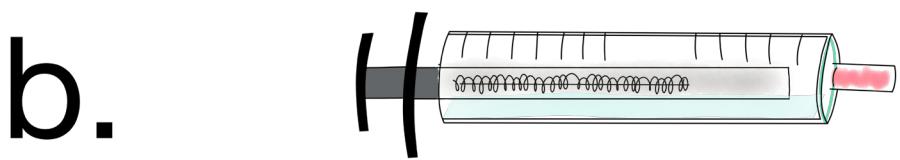
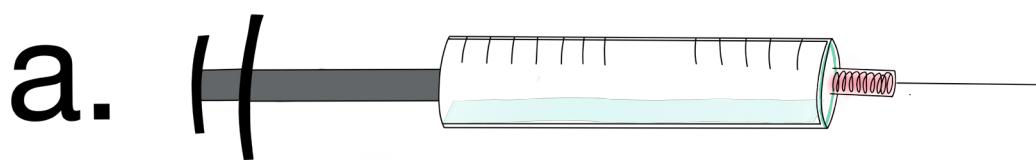
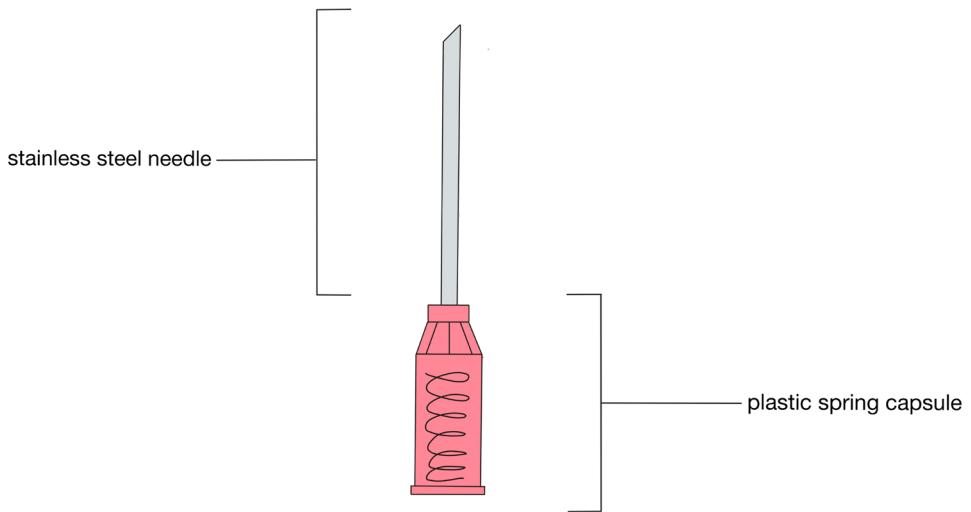
current design flaws:

- easy disassembly
- loose spring
- air used for buffer
- not intuitive

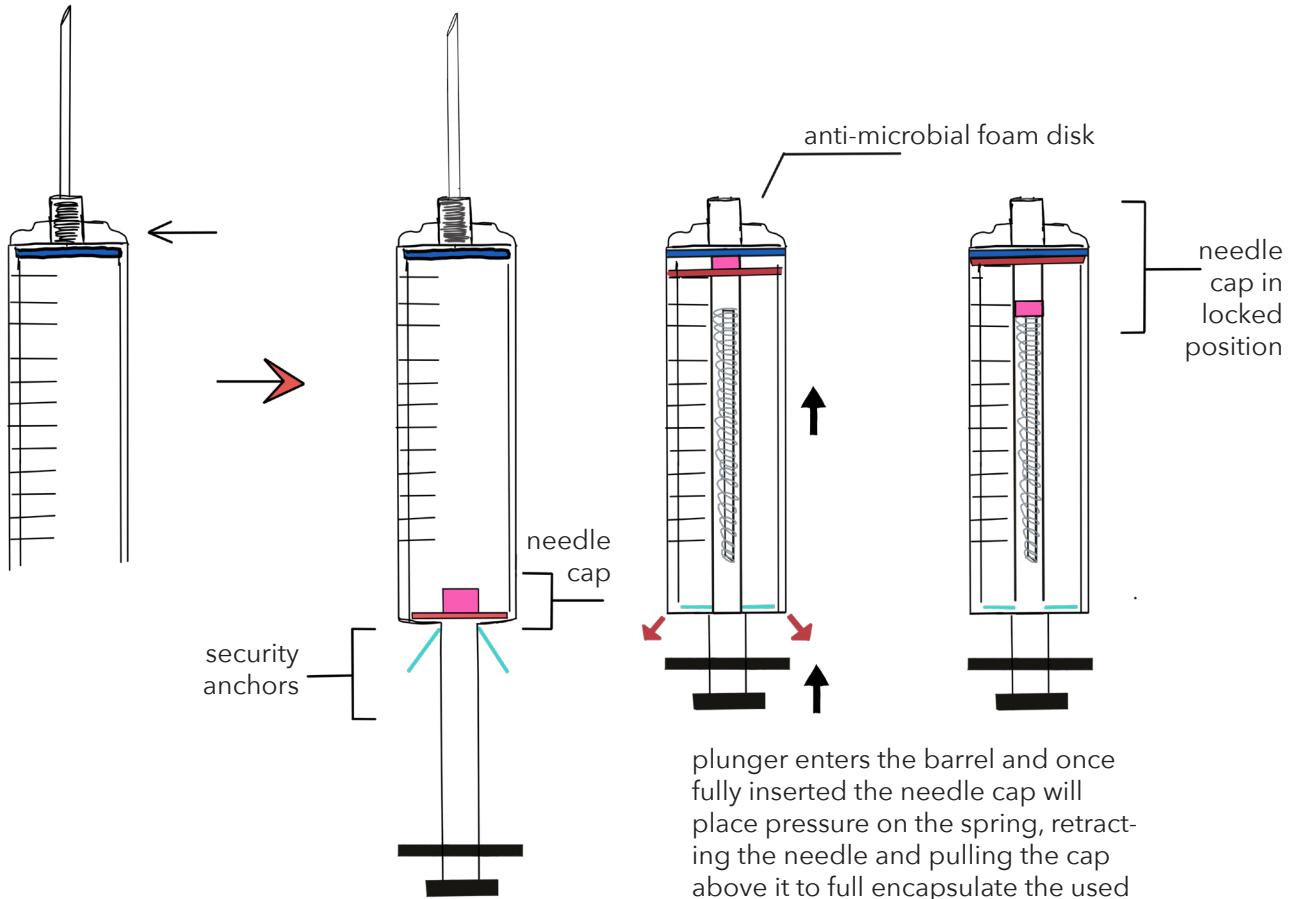
Design #1



small plastic piece
acts as trigger to
place pressure on
the spring to propel
it backwards into
the barrel of the syringe
after use.

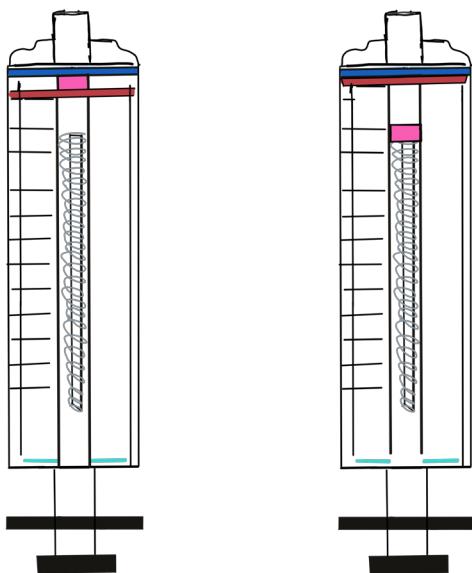


Design #2



plunger enters the barrel and once fully inserted the needle cap will place pressure on the spring, retracting the needle and pulling the cap above it to full encapsulate the used needle in the syringe.

anchors pull out parallel to the plunger barrel preventing access to the needle.

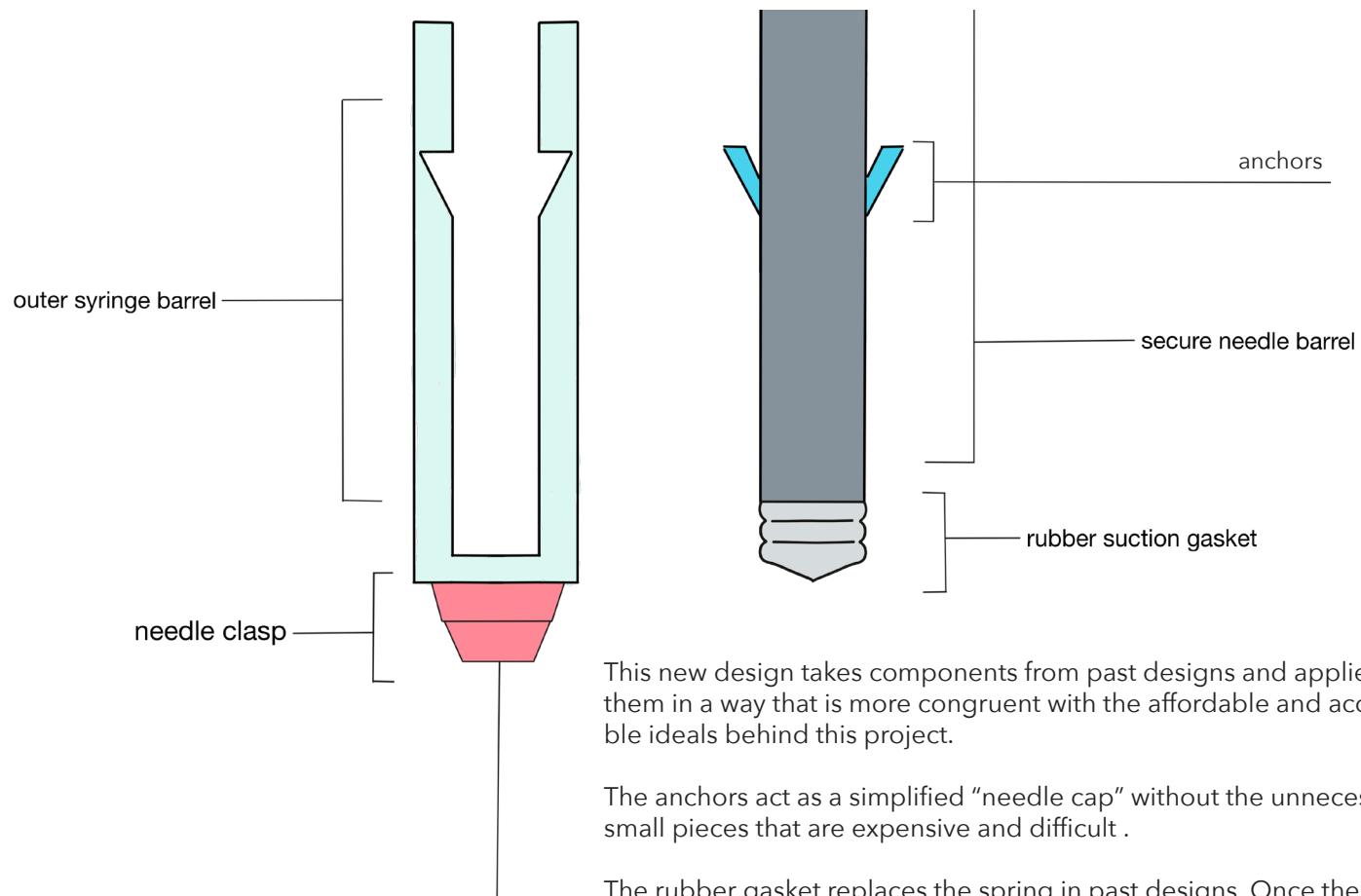
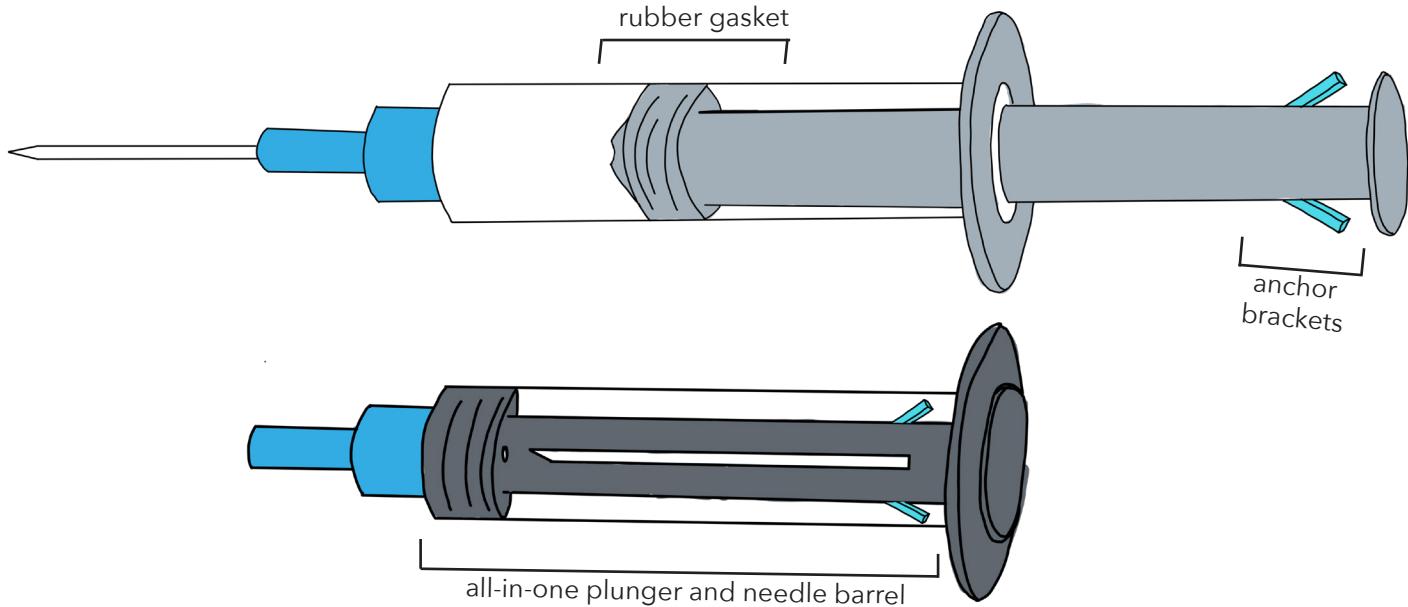


Pros:
 no air used, can be used in IDU
 needle is not accessible
 needle retracts automatically

Cons:
 many small pieces
 likely high manufacturing cost

Final design

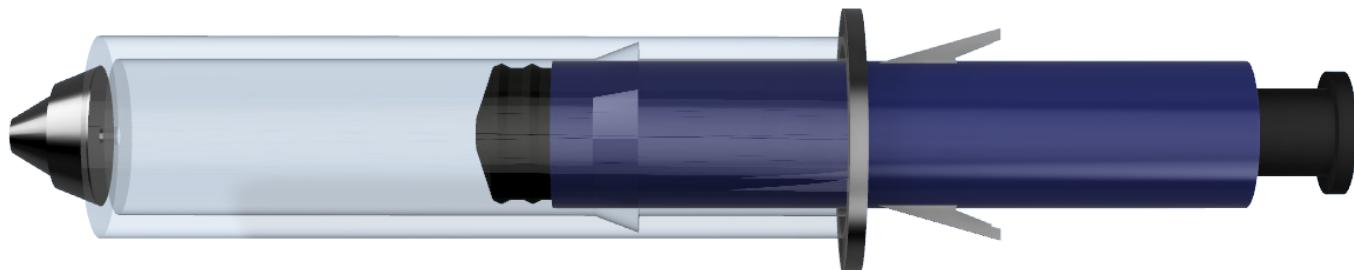
a hypodermic syringe that features a retractable needle and secure holding system that makes the needle safe to handle after use if not properly disposed of.



This new design takes components from past designs and applies them in a way that is more congruent with the affordable and accessible ideals behind this project.

The anchors act as a simplified "needle cap" without the unnecessary small pieces that are expensive and difficult .

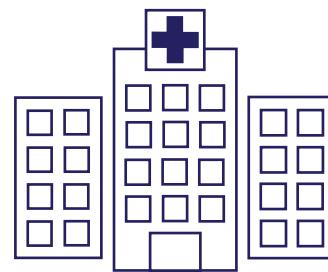
The rubber gasket replaces the spring in past designs. Once the plunger is fully expelled it will compress and expand, pulling the needle inside the barrel.



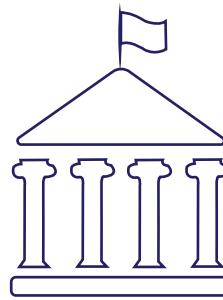
Needle Design Applications



Hospitals & Clinics
needles can be used by HCPs to increase safety



Government Funded Programs
needle exchanges and free clinics are a great way to increase clean needle use and to receive back used needles.



Homeless Individuals
intravenous drug users who inject in public spaces most commonly leave their needles exposed in public spaces.



Other Innovations:

Vanish Point Syringe



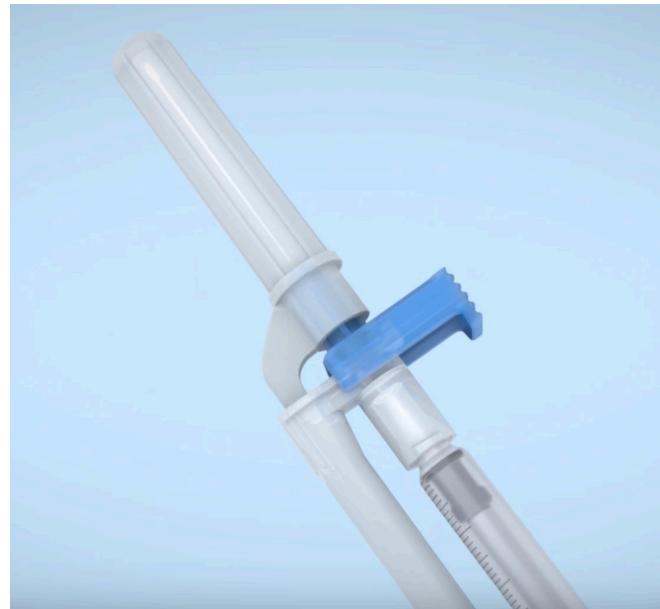
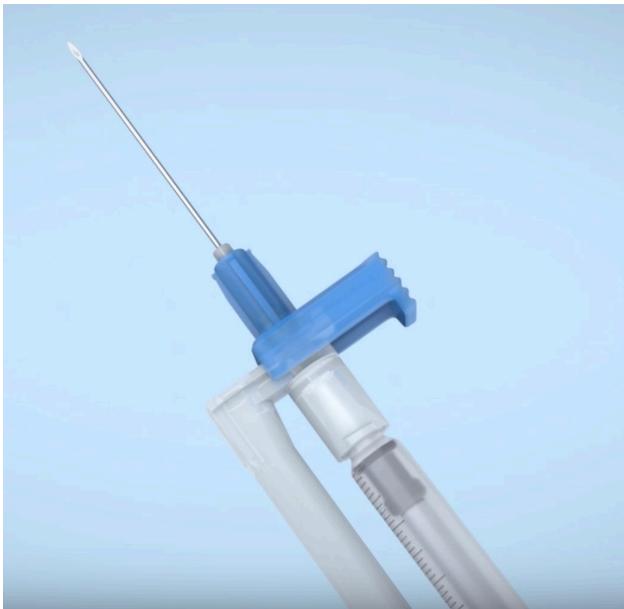
Pros:

Innovative Design
Automatic Retractable Needle

Cons:

Air is used as barrel buffer, not suitable for veins
Expensive manufacturing cost
Less than intuitive use

Easy Point Syringe

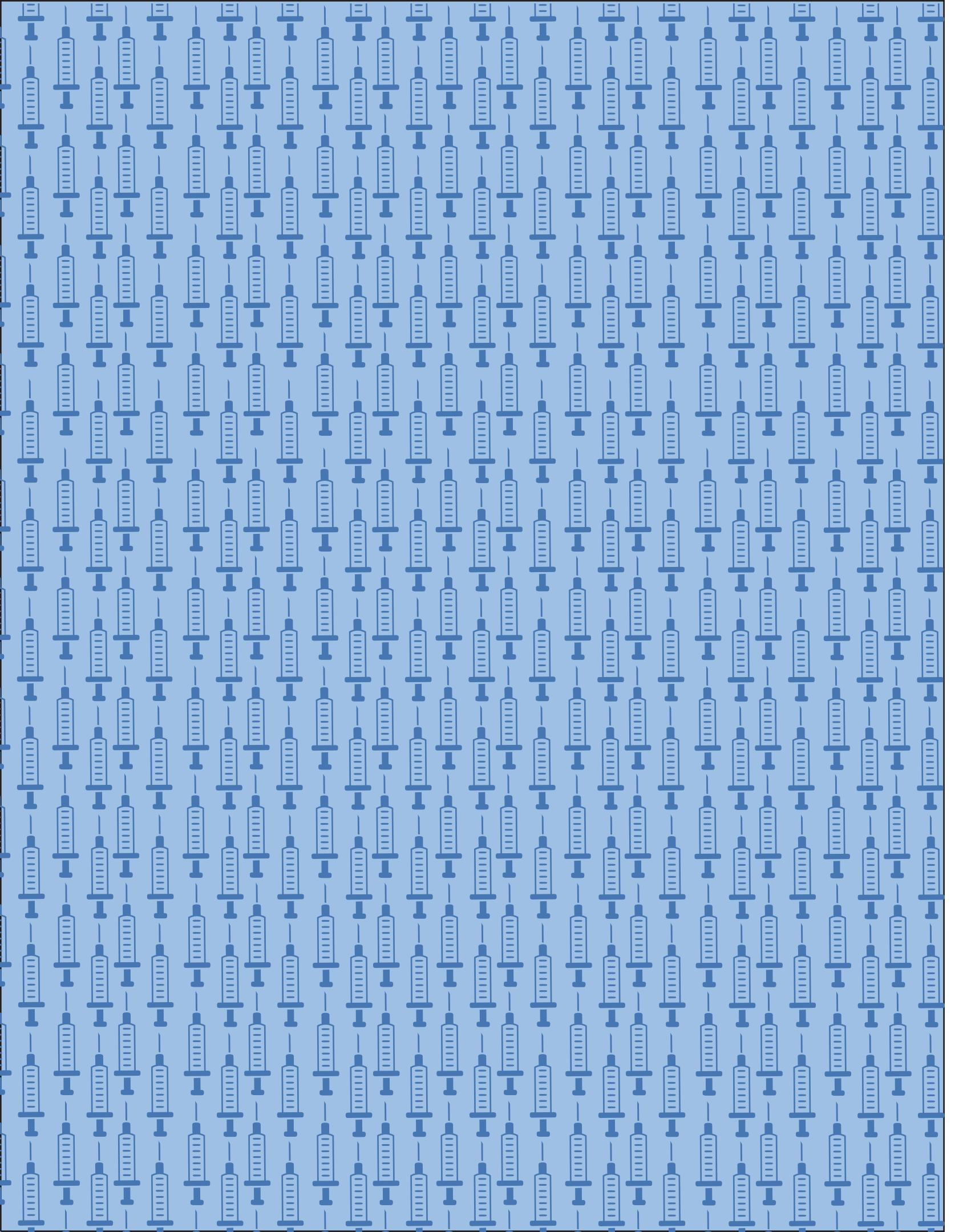


Pros:

less expensive design
no air use for buffering

Cons:

needle retraction is manual
a two step process
relies on user to retract needle



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Syringe Redesign
Parsons Open Campus
Product Design Intensive
Prof. Will McHale
July 8 - 26

Special thanks to:
Becky Piroga & Kathryn Duesman - Retractable
Technologies

Val - Lower Eastside Harm Reduction Center

Sources:

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