

Personalized Medication Disposal System

Product Design Specifications

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Function: When opiates like morphine or hydrocodone are prescribed to patients, often times they are not taken to completion by the user. If these drugs are not disposed of by the patient, the drugs can often times be stolen, abused, or misused by family and friends. Moreover, if the drugs are disposed of incorrectly, they present a significant threat to the quality of water in the water tables. A personalized medication disposal system to prevent the improper use of opiates is proposed. Currently, there are medication disposal systems available in hospitals and some police stations. There are also at-home, single use drug disposal packets available for purchase. Our goal is to design and develop a re-useable, at-home opiate disposal system that renders these drugs unusable and unrecoverable.

Client Requirements:

1. Render hydrocodone and oxycodone inert
2. Able to use in an “at home” setting
3. As convenient as dumping drugs down toilet/sink
4. Does not produce harmful by-products
5. Eco-friendly
6. Affordable for average person
7. Safe for use by average person

1. Physical and Operational Characteristics:

a. *Performance:*

- Must completely neutralize/denature medication
- Drugs must be unrecoverable by physical or chemical means
- Drugs must be neutralized within a 48-hour time period

b. *Safety:*

- Safe for use by average person
- No dangerously high temperatures, pHs, etc.
- Environmentally friendly
- non-toxic
- Children-safe locking cap
- Directions for proper disposal must be included

c. *Accuracy and reliability:*

- Must be able to render drugs inert and in an unrecoverable state

d. *Life and service:*

- The device needs to be used for years worth of prescriptions without malfunction or failure of the device
- Able to take apart and repair without risk to integrity
- Activated ingredient ought to be made available for purchase in bulk from store locations.

e. *Shelf life:*

- Should be able to set on the shelf for a few years without breaking down or becoming ineffective

f. *Operating environment:*

- Homes, pharmacies, portable, etc.
- Able to be used practically anywhere with water access

g. *Ergonomics:*

- Easy to understand and use
- Sit flat on a level surface
- Not slippery
- Does not get too hot on exterior
- Rotation ought to be smooth

h. *Size:*

- The entire device should be the same size as, or slightly larger than, a normal medication disposal device.

i. *Weight:*

- Less than 2.25 kg

j. *Materials:*

- Powder substance used to transform and render the medicine inert
- Grinder cap where pills will be placed for future grinding
- Pill bottle attachment with holes for medicine powder to fall through
- Measuring Device attached to grinder cap for easy measuring of powder substance
- Containment unit
 - Original or designed plastic medication pill bottle

k. *Aesthetics, Appearance, and Finish:*

- Not overly complex
- Compact
- Non-intimidating

2. **Production Characteristics**

a. *Quantity:*

- One, reuseable

Target Product Cost:

- Manufactured for ~\$5
- Testing can cost ~\$200

Miscellaneous

a. *Standards and Specifications:*

- Adhere to FDA and Dane County medication disposal regulations
- No illegal products/byproducts
- Federal DEA regulations do not permit controlled substances to be removed for disposal without special approval according to procedures established by regional DEA offices.
- Medical Facilities must submit extensive record keeping for the disposal of controlled substances.
- Controlled substances can never be returned to the pharmacy for re-use.
- Controlled substances are more tightly regulated, and so must often be destroyed by a licensed pharmacist or nurse practitioner with another licensed medical staff person as witness.
- 17 states are silent on the specific process of destruction.

b. *Customer:*

- Usable in residential setting
- Easy enough for use by average person
- No components unsafe for use by average person
- Safe for standard household use

c. *Patient-related concerns:*

- All parts included must be safe for use by average person
- Must not create harmful products
- Outside does not exceed 37 degrees C or get less than -33 degrees C
- pH of potential chemicals in use/ by products 9-5 to prevent chemical burns

d. *Competition:*

- Cactus Smart Sink®
- Med Drop boxes at Police Stations
- Other patented personal medication disposal systems (Medsaway)

RESOURCES:

<http://www.drugstore.com/medsaway-medication-disposal-system/qxp471622>

<http://www.cactusllc.net/>

<http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Reports/downloads/LewinGroup.pdf>

http://www.deaiversion.usdoj.gov/fed_regs/rules/2014/2014-20926.pdf