

### SAFE AND SUSTAINABLE: A GREEN APPROACH TO DRUG DISPOSAL

Unused drugs can harm our land, water and communities. We need a solution.



Improper disposal of unused and expired medications can damage our environment. While it's important to get rid of leftover drugs to prevent them from being misused or falling into the wrong hands, improper disposal of unneeded medications can result in environmental harm and contamination of our natural resources.

Prescription and over-the-counter medications are being flushed down sinks and toilets or tossed in the trash and landing in our landfills – where these still-potent drugs can contaminate our water and soil.1

Americans are prescribed approxomately 4.4 billion drugs annually and an estimated two-thirds go unused.2 It's clear that we need a safe, simple and environmentally sound disposal solution that prevents misuse and protects our lakes, rivers and land.

Deterra® System's innovative plant-based pouches allow users to permanently destroy unwanted drugs and dispose of them safely right at home. The organic, proprietary activated carbon in each pouch deactivates the drugs, making them unavailable for misuse and preventing them from leaching into our soil and water.

Created by Verde Environmental Technologies, Inc., Deterra Pouches prevent future environmental contamination<sup>3</sup> and contain a smaller percentage of plastic when disposed of than competitor products.<sup>4</sup>

Safe, permanent drug destruction can help prevent unused medications from ending up in the air, water and soil as well as reduce the risk of misuse and abuse. We must take steps now to protect the environment and preserve our natural resources. Proper drug disposal is part of the solution.

> To learn more about the role of at home drug disposal in preventing environmental contamination and substance abuse contact us:









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Deterra's plant-based pouches have a smaller carbon footprint because they use organic carbon, are over 50% biobased, and carry the I'm green certification.



In 2019 there were up to 200 pharmaceuticals detected in surface water, ground water and/or drinking water.<sup>1</sup>



Conventional water treatment processes ONLY remove approximately 50% of pharmaceuticals from drinking water.<sup>2</sup>



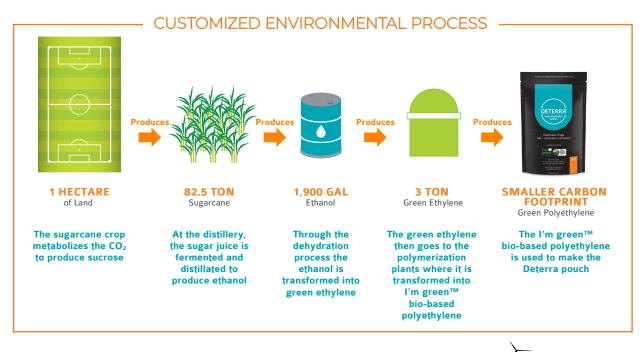
One in four Americans admit to flushing leftover/unused prescription drugs down the drain, and another 25% toss unused prescriptions in the trash.<sup>3</sup>



61% of Americans are concerned that flushing painkillers pollute their drinking water and public water ways.<sup>4</sup>

80%

More than 80 percent of all the wastewater from industry, homes, cities, and agriculture is released into the environment without adequate treatment and flows back into the ecosystem via lakes, rivers, and other bodies of surface water.









This consumer pouch has been manufactured in a factory designed and built to LEED® Silver sustainable building guidelines on equipment powered by 100% wind-generated electrical energy.

Visit <u>DeterraSystem.com</u> to learn more about proper drug deactivation and disposal or reach out to (612) 568-1128 or <u>Sales@DeterraSystem.com</u>.





An independently tested, safe and environmentally sound solution to permanently deactivate, destroy and dispose of unused and unwanted pills, patches, liquids, creams and films right at home.

### THE THREAT:

Improper disposal of unused prescription and over-the-counter medications poses a risk to the environment. Leftover drugs that are disposed of via flushing, sinking or tossing in the trash are ending up in landfills and surface water, where these still-potent drugs can harm the environment and contaminate our water systems.

- Wastewater treatment plants are generally not designed nor equipped to remove pharmaceuticals. Depending on the drug, removal efficiencies range from 20% to more than 80%.<sup>1</sup>
- In a 2019 study by The Organization for Economic Co-Operation and Development, there were 101-200 pharmaceuticals detected in surface water, ground water and/or drinking water.<sup>2</sup>
- A 2018 study by the Puget Sound Mussel Monitoring Program found traces of oxycodone in the tissues of bay mussels in Seattle and Bremerton harbors; the study noted that pharmaceuticals and illicit drugs are typically found in these waters and could impact the development and behavior of other shellfish and fish as well.<sup>3</sup>
- According to the United Nations World Water Development Report, more than 80% of all the wastewater from industry, homes, cities and agriculture is released into the environment without adequate treatment and flows back into the ecosystem via lakes, rivers, and other bodies of surface water.<sup>4</sup>

### AN ENVIRONMENTALLY SOUND SOLUTION:

Deterra prevents active drugs from contaminating our water supply and landfills.

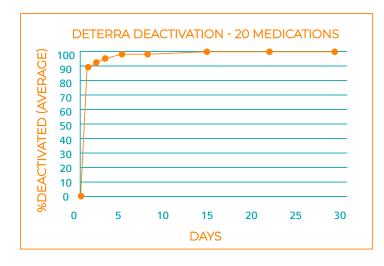
- The carbon used in Deterra is organic, chemical-free and safe for at-home use and disposal in normal household trash.
- The pharmaceuticals adsorbed by the Deterra Pouch were resistant to leaching by water, 30% ethanol, or other means, with only trace amounts detectable after an extensive washout. This demonstrates the long-term effective adsorption of the deactivated pharmaceutical from the environment.
- Deterra provides an alternative to flushing medications, which has been shown to lead to contamination of the water supply.
- There are many published reports of the occurrence of pharmaceuticals in sewage, surface waters, ground waters and elsewhere, including a national study by the USGS that found more than 80% of streams sampled contained antibiotics, pharmaceutical compounds or other organic wastewater contaminants.<sup>5</sup>



### AN EVIDENCE-BASED SOLUTION:

Deterra is independently tested and proven to permanently and irreversibly deactivate drugs, rendering them non-retrievable and unrecoverable for all practical purposes.

- The Deterra Drug Deactivation System was developed under two Small Business Innovation Research contracts (Contract N43DA-13-4420<sup>6</sup> and Contract N44DA-14-44207) from the National Institute on Drug Abuse (NIDA)8 a division of the National Institutes of Health (NIH).
- The activated carbon used within the Deterra system was shown to be highly effective in deactivating all forms of drugs tested including tabs, capsules, liquid, patches and films. The mean deactivation of active pharmaceutical ingredients and delivery formulations by activated carbon across all products tested was 99.6%.



### A CONVENIENT SOLUTION THAT CAN CHANGE BEHAVIOR:

Deterra is easy to use for at-home deactivation and disposal.

- A recent Mayo clinic study shows that 93.5% of people co-dispensed a Deterra pouched used it to safely deactivate and dispose of their unused medications.9
- Data from a March 2019 JAMA Surgery Research Letter 10 on a University of Michigan clinical trial 11 indicates Deterra use is correlated with an 8-times greater<sup>12</sup> likelihood of unused and unwanted drug disposal as compared to usual care.
- 96% of consumers report using Deterra within four weeks of receipt; nearly half report product use within 24 hours. 13
- 95% of consumers report using Deterra with no difficulty.<sup>14</sup>
- · Adding warm tap water into Deterra's pouch initiates the carbon-based deactivation process and it can be thrown in the normal household trash. The empty pill bottles and other packaging can be recycled.
- The U.S Food & Drug Administration (FDA) recognizes the availability of at-home drug disposal technologies for disposal in the household trash. 15

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https://www.oecd.org/environment/resources/pharmaceutical-residues-in-freshwater-policy-highlights.pdf

https://www.pugetsoundinstitute.org/2018/05/bay-mussels-in-puget-sound-show-traces-of-oxycodone/

http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2017-wastewater-the-untapped-resource-

<sup>5</sup>https://toxics.usgs.gov/pubs/OFR-02-94/index.html 6https://www.sbir.gov/sbirsearch/detail/679178

<sup>7</sup>https://www.sbir.gov/sbirsearch/detail/709797

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cal Trial. JAMA Surg. Published

# DESTROY DRUGS – NOT THE ENVIRONMENT

Deterra Drug Deactivation and Disposal System Plant-based Pouches reduce the risk of medication misuse and environmental contamination

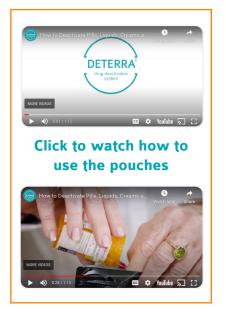


### **CHALLENGE**

### UNUSED MEDICATIONS CAN HARM THE ENVIRONMENT

Drug disposal is an important part of solving the substance misuse epidemic, but how we dispose of unused medications is key to preventing pharmaceuticals from harming the environment. Common, but ineffective, methods of medication disposal include household trash or flushing down the drain or toilet. These methods maintain the integrity of the active drugs, which can end up in landfills, water systems and soil.<sup>1</sup>

Most of our water treatment systems use technologies that don't remove a wide variety of today's contaminants, including pharmaceuticals.<sup>2</sup> According to the United Nations World Water Development Report, more than 80% of wastewater is released into the environment without adequate treatment and flows back into the ecosystem via lakes, rivers, and other bodies of surface water.<sup>3</sup>



### SOLUTION

### SAFE, PERMANENT AND ENVIRONMENTALLY SOUND DRUG DISPOSAL

The patented Deterra® System provides a convenient and immediate at-home disposal method that permanently destroys drugs and prevents these potentially harmful chemicals from contaminating our environment.⁴

Our innovative plant-based Deterra Pouches contain organic, proprietary activated carbon that has been independently tested and scientifically proven to deactivate medications, rendering them inert and safe for disposal in the normal household trash.

Deterra has a smaller carbon footprint than competitor products and is environmentally sound through the entire product life cycle.<sup>5</sup>

Deterra's plant-based pouches are USDA Certified, 50% or more bio-based, and have earned the I'm green<sup>™</sup> plastic certification. Our packaging is derived from renewably sourced sugarcane and produced using 100% wind-generated power in a facility built to LEED® Silver sustainable building guidelines.

We need to start now to prevent prescription drugs from contaminating our natural resources. Deterra is a safe and simple solution for deactivating and disposing of drugs that everyone can use to prevent drug misuse and environmental harm.





- Deterra is the only independently tested and environmentally sound drug disposal system that permanently deactivates pills, patches, liquids, creams and films.
- The patented Deterra System is powered by proprietary organic activated carbon to render drugs inert and safe for disposal in the normal household trash.
- Deterra's plant-based packaging is USDA Certified, 50% or more bio-based and has earned the I'm green<sup>™</sup> plastic certification.
- Deterra Pouches are manufactured in a factory built to LEED® Silver sustainable building guidelines on equipment powered by 100% wind-generated electrical energy.
- Deterra Pouches are printed using expanded color gamut process printing to reduce ink consumption and waste production.
- Deterra deactivates all organic medications including opioids.\*

T T

"What we need to do is find ways to safely dispose of our pharmaceuticals rather than flushing them down the toilet or dump them in the trash."

- Mitch Ratcliffe, author & creator of Earth911 podcast

To learn more about the role of at home drug disposal in preventing environmental contamination and substance abuse contact us:







<sup>1</sup>https://toxics.usgs.gov/highlights/2014-08-12-leachate\_pharm.html

<sup>2</sup>https://www.usgs.gov/special-topic/water-science-school/science/pharmaceuticals-water?qt-science\_center\_objects=0#qt-science\_center\_objects

 $^3$ http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2017-wastewater-the-untapped-resource/

Based on the likelihood of extractable active medications available when used according to label instructions.

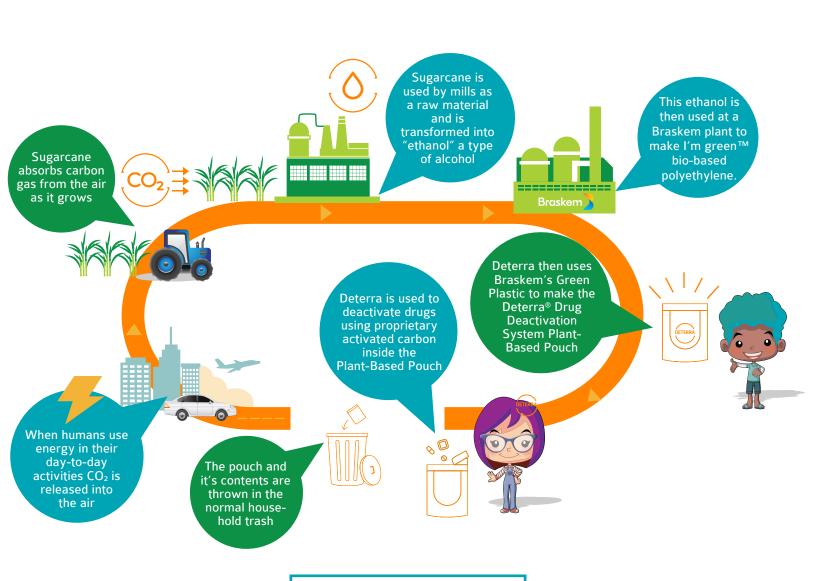
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<sup>&</sup>lt;sup>5</sup>As a percentage compared to Deterra products, competitor products contain an increased percentage of plastic when disposed: DisposeRx® 59%; NarcX® 78%; RX Destroyer™ 68%; Drug Buster® 67%.



### DETERRA'S PLANT-BASED POUCH HAS A SMALLER CARBON FOOTPRINT

The packaging is USDA Certified, 50% or more bio-based, and has received the I'm green™ plastic certification from Braskem. According to Braskem's calculations every case of Deterra® produced can prevent up to 5 lbs of CO₂ from contributing to Global Warming Potential.





# SUSTAINABLE PRODUCTION PROCESS

Deterra is printed using **expanded color gamut process printing**, which allows for:



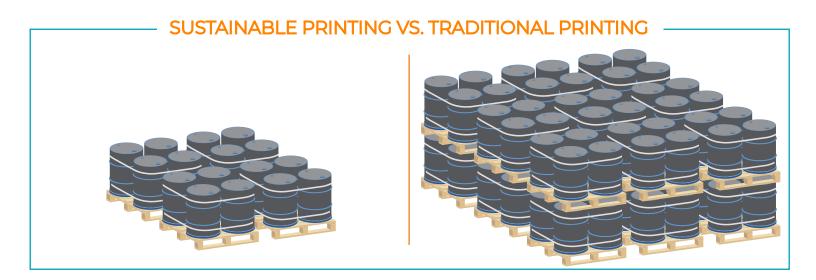
Reduces ink consumption by up to 35%



Reduces ink waste by up to 95%



Eliminates clean up between jobs reduces solvent use, emissions and hazardous waste by up to 80%





### DETERRA IS THE SOLUTION

Unused and unwanted prescription drugs that remain in the home, including opioids and other controlled substances, provide greater availability for misuse, abuse, and diversion. This can pose a potentially deadly risk.



### **DETERRA WORKS**

- With prescription drug takeback boxes and national takeback days sporadic, at-home drug disposal is a viable, life-saving alternative to rid the nation of billions of unused and unwanted dosage units remaining each year.
- Deterra meets DEA's standards (21 CFR 1300.05) around non-retrievability for disposal, rendering products permanently and irreversibly deactivated for all practical purposes.
- Deterra's proprietary activated carbon is resistant to back-extraction efforts. Deterra works for all drug forms, including pills, patches, liquids, creams and films.
- Deterra use has been correlated with an 8-times greater likelihood of PROPER disposal of unused and unwanted drugs as compared to standard care.



### **DETERRA IN THE COMMUNITY**

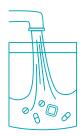
- Once used, Deterra is safe to dispose of in the household trash with no negative effect on the environment, including groundwater and landfills.
- · At-home drug disposal and deactivation has been cited as a viable option by national leaders, including:
  - The President's Commission on Combatting Drug Addiction and the Opioid Crisis
  - The Food and Drug Administration
  - White House Office of National Drug Control Policy
  - Current and Former State Attorneys General
  - State<sup>iii, iv, v</sup> and Federal<sup>vi</sup> Legislatures.
- Deterra was developed under a two part Small Business Innovation Research Contract with the National Institute on Drug Abuse.
- Partners include the DEA Educational Foundation, Community Anti-Drug Coalitions of America (CADCA), National Consumers League (NCL), Mother's Against Prescription Drug Abuse (MAPDA) and several State Attorneys General.
- Commercial and national distribution across six different healthcare market verticals.

## WITH DETERRA, UNUSED PRESCRIPTION OPIOIDS AND OTHER DRUGS ARE GONE - FOR GOOD.





Tear open pouch – do not open or remove inner pod(s). Place unused medications inside.



2

Fill pouch halfway with warm water and wait 30 seconds for air to release. Some foaming may occur.



3

Seal pouch tightly, gently shake and dispose of in normal trash.

Effect of an Activated Charcoal Bag on Disposal of Unused Opioids After an Outpatient Surgical Procedure: A Randomized Clinical Trial. JAMA Surg. Published online March 27, 2019. doi:10.1001/jamasurg.2019.0155 "Assuming PROPER Disposal excludes sinking and flushing

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"NJ: https://www.njleg.state.nj.us/bills/BillView.asp/Session=LIS2018&BillNumber=A566/, https://www.njleg.state.nj.us/bills/BillView.asp?Session=LIS2018&BillNumber=S3933
"CA: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\_id=201720180SB212
"UT: https://le.utah.gov/~2020/bills/static/SB0029.html
"Support Act: https://www.congress.gov/bill/115th-congress/house-bill/6



# DETERRA DRUG DEACTIVATION SYSTEM FREQUENTLY ASKED QUESTIONS (FAQ'S)



### What is the Deterra Drug Deactivation System?

The Deterra® Drug Deactivation System is a safe medication disposal pouch or container that can be used at home or in a clinical setting. It is the safest, most effective choice used to destroy and properly dispose of unused, unwanted, and expired medications with the simple addition of tap water.

### How is Deterra different from its competitors?

- Our technology is protected by 11 US patents and 33 international patents and cannot be replicated by others.
- Deterra contains enough activated carbon to permanently deactivate the amount of medication claimed on the label. Other carbon-based disposal products may not, leaving medications available for misuse and abuse
- We don't just mask medications in a gel or liquid; our patented approach completely destroys pills, patches, liquids, creams and films.
- Deterra Pouches contain a smaller percentage of plastic when disposed of than competitor products.1

### How does the Deterra Drug Deactivation System work?

Each patented Deterra Pouch contains a water-soluble inner pod containing proprietary activated carbon. To dispose of prescription or over the counter medications, a user places the drugs in the pouch and adds water, which dissolves the inner pod and releases the activated carbon. The carbon binds to the active ingredients in the medications. Once deactivated, the drugs are permanently and irreversibly destroyed, unavailable for misuse and safe for disposal in the normal trash.

### Why is Deterra better for the environment? Aren't we just adding another plastic bag to landfills?

Deterra is environmentally sound through the entire product life cycle. From using 100% wind-generated power in production of the plant-based pouches to the non-toxic organic ingredients to its innovative pouch design, the product:

- Provides a convenient and immediate alternative to flushing or discarding medications and prevents still-potent drugs from contaminating our water supply and landfills through activated carbon adsorption.
- Has a smaller carbon footprint due to its plant-based packaging. The packaging is USDA Certified, 50% or more bio-based, and has received the I'm green™ plastic certification.
- Deterra Pouches are manufactured in a factory built to LEED® Silver sustainable building guidelines on equipment powered by 100% wind-generated electrical energy and are printed using an Expanded Color Gamut Process to reduce ink consumption and waste.
- Deterra 1.0 Containers are comprised of 25% Post-Consumer Recycled (PCR) material.

For more FAQs and information about Deterra, visit <u>DeterraSystem.com</u>.

# DETERRA DRUG DEACTIVATION SYSTEM FREQUENTLY ASKED QUESTIONS (FAQ'S)



### What drugs will Deterra deactivate?

The Deterra® Drug Deactivation System will deactivate organic medications including opioids. However, Deterra will not adsorb biologics, such as vaccines and immunotherapeutics which are typically administered in a healthcare setting. Additionally, inorganic medications, such as antacids, lithium and iron supplements will not be adsorbed.

If your medication has specific disposal instructions, please follow the directions as given. Consult authorities or your pharmacist for more specific questions.

### Does Deterra expire?

Deterra pouches and containers do not expire.

### What are Deterra storage temperature requirements?

Deterra products do not need to be stored at a specific temperature and do not lose efficacy when stored in extreme heat or cold. However, the pouch or container may expand or contract in these conditions.

### How quickly does the deactivation process start?

With Deterra, the process of deactivation starts immediately, but it can take time to complete. Some highly soluble drugs will dissolve and adsorb rapidly, while other less soluble drug types will take longer to dissolve and adsorb. The deactivation period varies based on volume and type of medication. As an additional safety precaution, it is important to keep Deterra out of reach of children and pets as the medication is deactivated.

### Does Deterra come in multiple sizes?

Yes, Deterra is available in multiple sizes. Visit our website or contact a Deterra representative at 612.568.1128 to determine which size will best meet your needs.

### How many drugs can Deterra containers and pouches deactivate at a time?

The recommended capacity varies by size and is listed on each Deterra Pouch or Container. Please always follow the directions on the back of the Deterra Drug Deactivation System.

### What if I accidentally add more drugs than the recommended amount?

Adding drugs to Deterra in amounts at (or less than) our recommended capacity will result in optimal deactivation efficiency. If one were to add slightly more than the recommended pharmaceutical capacity, deactivation of additional drugs will still occur but at reduced efficiency. Please always follow the directions on the back of the Deterra Drug Deactivation System.

### THE DETERRA DRUG DEACTIVATION SYSTEM IMPROVES PROPER DRUG **DISPOSAL BEHAVIORS**

As reported by a study published in JAMA Surgery and conducted by the University of Michigan Opioid Prescribing Engagement Network and partially funded by the National Institute on Drug Abuse (NIDA).



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Post surgical patients had leftover opioids



Only 18% of post surgical patients with leftover opioids disposed of them properly

> When given a Deterra® Pouch 52% of post surgical patients with leftover opioids disposed of them properly

Significantly reducing the amount of drugs flushed down the sink or toilet and thrown in the trash without proper deactivation - reducing both the risk for environmental contamination and diversion





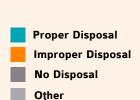
More likely to PROPERLY dispose of opioids when given the Deterra Pouch

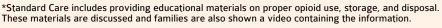


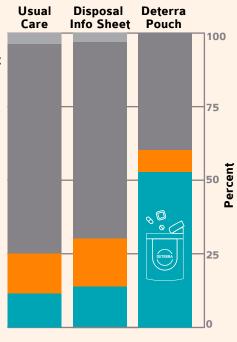
### **Disposal Definition for this Infographic**

**Proper** = Drug deactivation using Deterra pouch prior to disposal in trash, Drug Take Back Event, Law **Enforcement or Authorized Pharmacy** 

Improper = Toilet, Sink, Trash as is, Trash mixed with unpalatable substance







"Our findings suggest that simple, low-cost interventions such as in-home deactivation methods, could reduce the number unused opioids available for diversion. Although this study represents data from outpatient surgical procedures at a single academic center, it highlights the importance of providing accessible disposal methods to reduce the flow of excess opioids into communities." - Study Authors

### **Deterra recipients:**

- Flushed less medication
- Less likely to improperly dispose in trash
- Contributed to 40% fewer households with leftover opioids

DeterraSystem.com

Source: Brummett CM et al. Effect of an Activated Charcoal Bag on Disposal of Unused Opioids After an Outpatient Surgical Procedure: A Randomized Clinical Trial. JAMA Surg. March 2019 Assuming proper disposal excludes sinking and flushing.

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Percentage of consumers who had **NO DIFFICULTY** using the Deterra System pouch:

95%

### WHY ARE CONSUMERS USING DETERRA SYSTEM POUCHES?

Concerned with

preventing damage to the environment:

91%



Concerned with

preventing drug abuse or diversion:

45%



Concerned with

preventing accidental poisoning:

37%



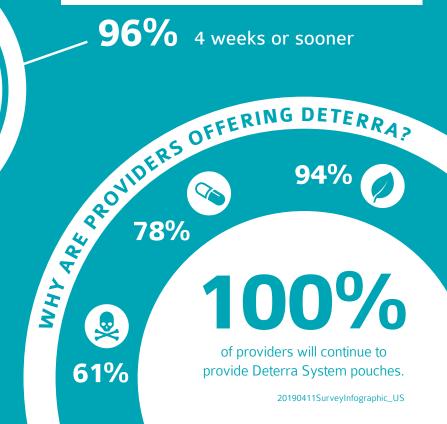
Between April 25 and May 1, 2016, a total of 1665 Deterra System User Surveys were given to 6 different providers to distribute to users, along with free samples of the Deterra pouch. Each provider of User Surveys was given Provider Surveys for staff, and Provider Surveys were also sent to current Deterra System bulk users.

### I AM. THE ANSWER.®

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### **HOW QUICKLY DO CONSUMERS USE THE DETERRA SYSTEM?**



# IT'S NOT DESTROYED IF IT'S NOT DETERRA



When it comes to safely and permanently destroying medications, the facts can be a little less clear. We'll keep it simple – it's not destroyed if it's not Deterra<sup>®</sup>.

### PERMANENTLY DESTROY DRUGS WITH DETERRA

Prevention is about more than dispensing less, it's about properly removing the excess supply of medications that exists. Deterra is the only at-home disposal product that has been comprehensively tested by an independent laboratory. It is a safe and environmentally sound solution for the permanent destruction of prescription and over the counter medication.

### **HOW IT WORKS**

Deterra is a simple and safe medication disposal system that can be used at home or in a clinical setting. It protects our environment and prevents drug abuse by immediately and permanently deactivating and disposing of unneeded pills, patches, liquids, creams and films<sup>1</sup>.

The patented three-step Deterra Drug Deactivation System is powered by proprietary organic activated carbon to render drugs inert and safe for disposal in the household trash.





Tear open pouch – do not open or remove inner pod(s). Place unused medications inside.





with warm water and wait 30 seconds for air to release. Some foaming may occur.

Fill pouch halfway





Seal pouch tightly, gently shake and dispose of in normal trash.

To deactivate and dispose of transdermal patches, attach sticky side of the patch to a facial tissue and insert into Deterra pouch.

<sup>1</sup>The deactivation process starts immediately but can take time to complete.



