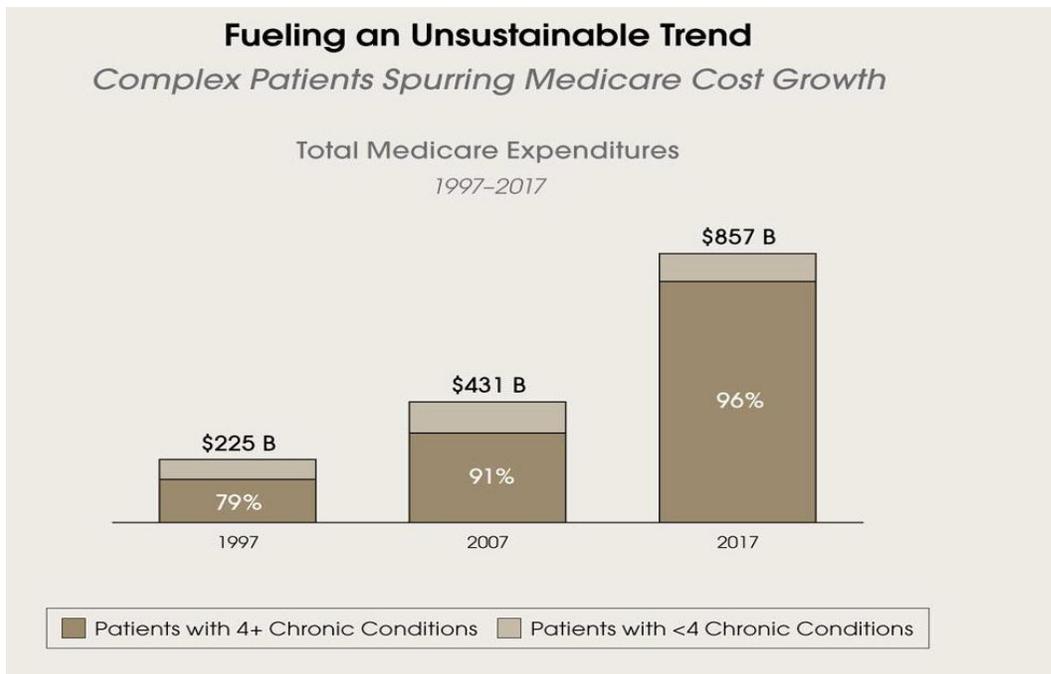


## Boosting Medication Adherence with TabSafe

Health care is consuming an ever-greater percentage of the nation's GDP – and efforts to control and curtail growth continue to confound policy makers, health care providers, payers, and consumers. Patients with the greatest number of chronic conditions, everyone agrees, consume a disproportionate and growing percentage of those costs. In fact, the cost of managing those patients with the most complex medical conditions is projected to be on an accelerating growth trajectory, particularly among older populations: (see Figure 1)



**Figure 1 Projected growth in Medicare expenditures for patients with complex conditions**

### Medication regimens overwhelm the most vulnerable populations

Despite packaging improvements and efforts to improve drug labeling, managing complex medication regimens properly is challenging. Whether it is from the proliferation of medications prescribed, the similarity in their brand names, or confusion over dose times and frequency,

patients struggle with compliance. Despite the best of intent from health care providers, family caregivers, senior living staff and home health professionals, inappropriate use has been sized at a societal cost of as much as \$290 billion annually, according to the 2009 New England Healthcare Institute.<sup>1</sup> Beyond cost, the impact on quality of life due to inappropriate use can be staggering, resulting from:

- **Avoidable visits to the hospital due to medication errors.** According to the CDC, 700,000 emergency department visits and 120,000 hospitalizations are due to adverse drug effects (ADEs) annually.<sup>2</sup> Medication errors are a frequent cause of ADEs, including the leading factor in medication errors – missed doses.<sup>3</sup>
- **Disproportionate risk of hospitalization for the elderly.** According to the CDC, the elderly (65 years or older) are twice as likely as others to visit emergency departments as a result of adverse drug events (over 177,000 emergency visits each year), and they are nearly seven times more likely to be hospitalized after an emergency room visit.<sup>4</sup>
- **Poor outcomes in vulnerable populations requiring complex medication regimens.** There are a number of disease states that require adherence to complex medication regimens. Otherwise patients can succumb to preventable but serious complications that require far costlier care. As an example, the numerous medications required after organ transplant must be taken properly or patients will suffer from organ rejection. It has been also been demonstrated with common chronic diseases like CHF, COPD, diabetes, mental health, and heart disease. Particularly in elderly patients, regimen complexity and type of caregiver assistance are known to correlate with medication non-adherence.<sup>5</sup>

**Helping vulnerable populations manage medications benefits society**

Patients who take the correct doses at the correct time are able to improve their health and maintain a higher and more independent quality of life.<sup>6</sup> And as a result of improved medication management and compliance, the health system benefits from:

- **Reduction in unnecessary hospital admissions (or re-admissions).** Studies have shown as much as a 79% reduction in hospitalization rate per patient when using a technology-enabled dispensing service over simple medication boxes. Going further, a recent NIH study concluded: “Integration of in-person contacts with technology-driven medication adherence reminders, electronic medication reconciliation, and pharmaceutical databases may improve medication adherence and have a positive effect on cardiovascular clinical outcomes.”<sup>7</sup>
- **Reduces fall risk from missed or inappropriate doses.** Each year one in three adults over the age of 65 suffers a fall.<sup>8</sup> Furthermore, each year 5-10% of falls result in serious injury. Although falls can result from a wide variety of causes (including the physical environment), side effects from medications, for example dizziness when standing up has been cited as a significant risk for falling. And that risk is noticeably elevated when the patient is taking three or more medications – when the patient is already at risk from side effects related to missed or inappropriate doses.<sup>9</sup>
- **Reducing the effort associated with dosage management.** The more complex the dosing schedule is for patients, the greater the effort required to comply. With pill bottles or boxes, patients must schedule and remember to take the right dose at the right time of day. Under the care of a nurse professional (at home or in senior housing), managing the dosing schedule and associated verification and documentation can be extremely time-consuming and expensive. In fact, “More than 40 percent of people over age 65 take five

or more medications, and each year about one-third of them experience a serious adverse effect, like a bone-breaking fall, disorientation, inability to urinate, even heart failure.”<sup>10</sup>

- Improves adherence in senior living environments.** Today’s senior housing settings are facing a frailer and older population – the average move-in age for Independent Living is now mid-80’s and the average resident age in Assisted Living has risen to 89.<sup>11</sup> Wellness nurses in each setting are devoting more of their time to managing medication times and dosages among residents. TabSafe offers a solution that has been shown through analysis of usage data to significantly reduce the number of missed doses among residents of assisted living communities and individuals living independently as shown in **Figure 2**.

	Released	Taken	Missed	%Adherence
<b>Assisted Living*</b>	<b>4802</b>	<b>3414</b>	<b>1388</b>	<b>71.10%</b>
<b>AL with TabSafe</b>	<b>312358</b>	<b>310286</b>	<b>2072</b>	<b>99.34%</b>
<b>Independent</b>				<b>40.00%</b>
<b>Independent + TabSafe</b>	<b>232682</b>	<b>224193</b>	<b>8489</b>	<b>96.35%</b>

Figure 2

Source: TabSafe

### TabSafe Features and Benefits

TabSafe is designed as a medication management system that can serve the needs of individuals living at home, supported by family caregivers, assisted by professional caregivers or residing in a senior living residence. In particular, its features include the ability to:

- Provide secure storage of medication.** The base unit is for one user, and is installed at the bedside (or other convenient location), in the home or in the extended care facility. It is modularly expandable in units of 4 cartridges that securely store the medications to

accommodate your needs. A single unit of 4 usually dispenses about 10 to 13 meds, 2 can handle twice that number. The medication is filled by the pharmacy, home user or caregiver into a cartridge instead of a pill bottle. The design allows for one type of medication per cartridge or multiple medications using an optional multi-dose cartridge. Its patented design allows one tablet or dose of more than one to be released at a time. A memory chip embedded in each TabSafe cartridge allows the pharmacist to correctly fill the cartridges and program them.

- **Alerts user to dose times and other ADL reminders.** TabSafe can be programmed to alert users to dosage times as well as supports medications taken on an as-needed basis. but it can also be used to remind about other activities of daily living – including times for meals, snacks, or other appointments.
- **Monitors adherence and can be programmed to collect vital signs.** TabSafe creates a web-accessible account, including the ability to generate reports, to monitor all medications taken by the patient, tracks usage amount and frequency, and helps to avoid adverse reactions. It can be programmed so that, a physician or nurse can also monitor vital signs remotely such as weight, blood pressure, and blood sugar.
- **Provides secure access to connect providers, caregivers, family, and user.** TabSafe has had documented success at improve monitoring adherence to prescription regimens, thus improving patient health outcomes and life quality. Care providers are able to deliver higher quality care, supported in the ability to maintain medication regimens essential to their well-being.

**TabSafe helps the Cochran family:** TabSafe's CEO, Dr. Stephen Axelrod, described why TabSafe was so critical for one family: "TabSafe allowed Frank Cochran to move his mother from an assisted living facility to an (independent living) apartment. According to Frank's mother, Ann Cochran, "I would just plain forget I had medicine to take." Now the two are able to spend more quality time together because Frank only has to refill the machine once or twice a month. It's saving him money, too, considering the potential and avoided cost. "All in all, it's probably been about a \$2,000 a month swing," Frank Cochran said. "You can even program the machine from your iPhone. It's a big relief, "knowing that I can literally log into the system from anywhere in the world via the Internet, look and see how it's dispensing, whether she's taken her medications on time or not."

## References

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- <sup>2</sup> <http://www.cdc.gov/MedicationSafety/basics.html>
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