



# Regenerative Spontaneity\*

September 21, 2019

\*Potentially curative, though sustainability of effect requires determination

# MyoStim ED a potentially significant and differentiated entrant



Erectile dysfunction is **very common**, especially in the rapidly aging population with co-morbid cardiovascular disease and diabetes



**Unmet needs remain** despite the presence of several treatments (algorithms) in the U.S. and Europe; PDE-5 inhibitors as first line therapy and a range of topicals, devices and procedures as second line therapy.

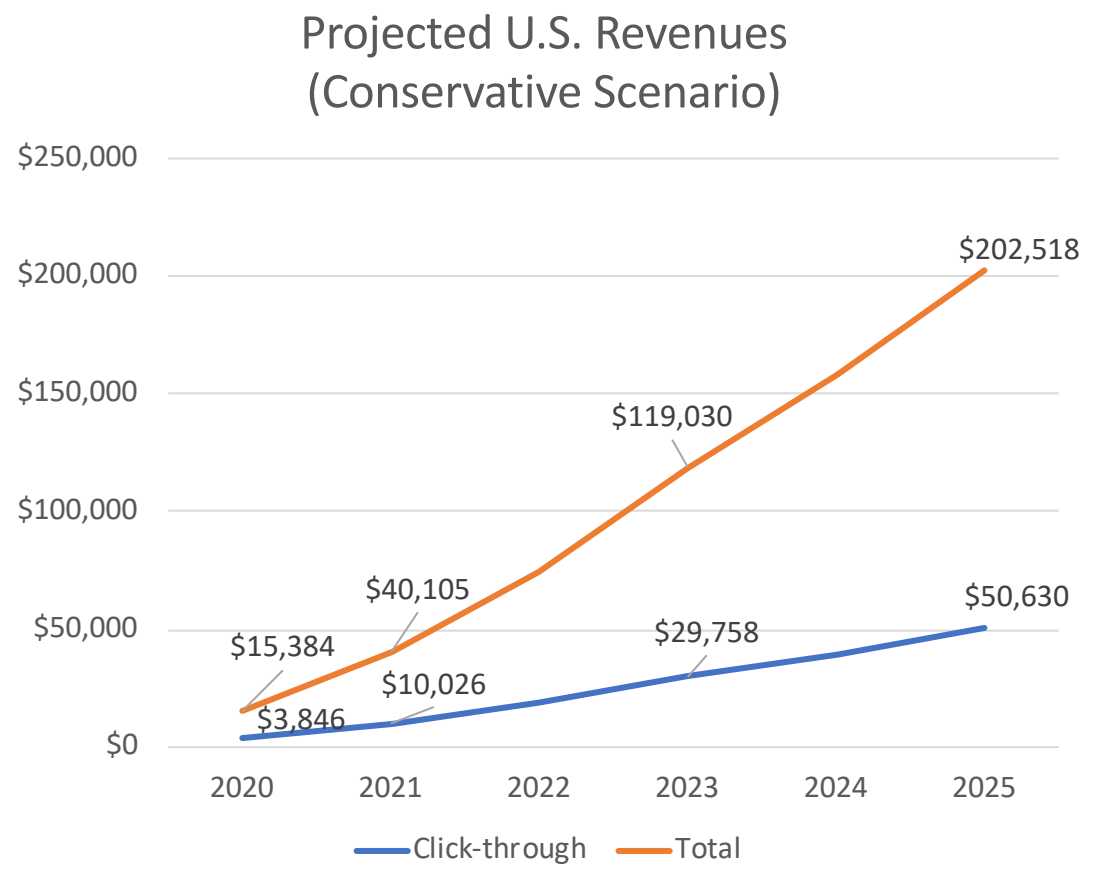
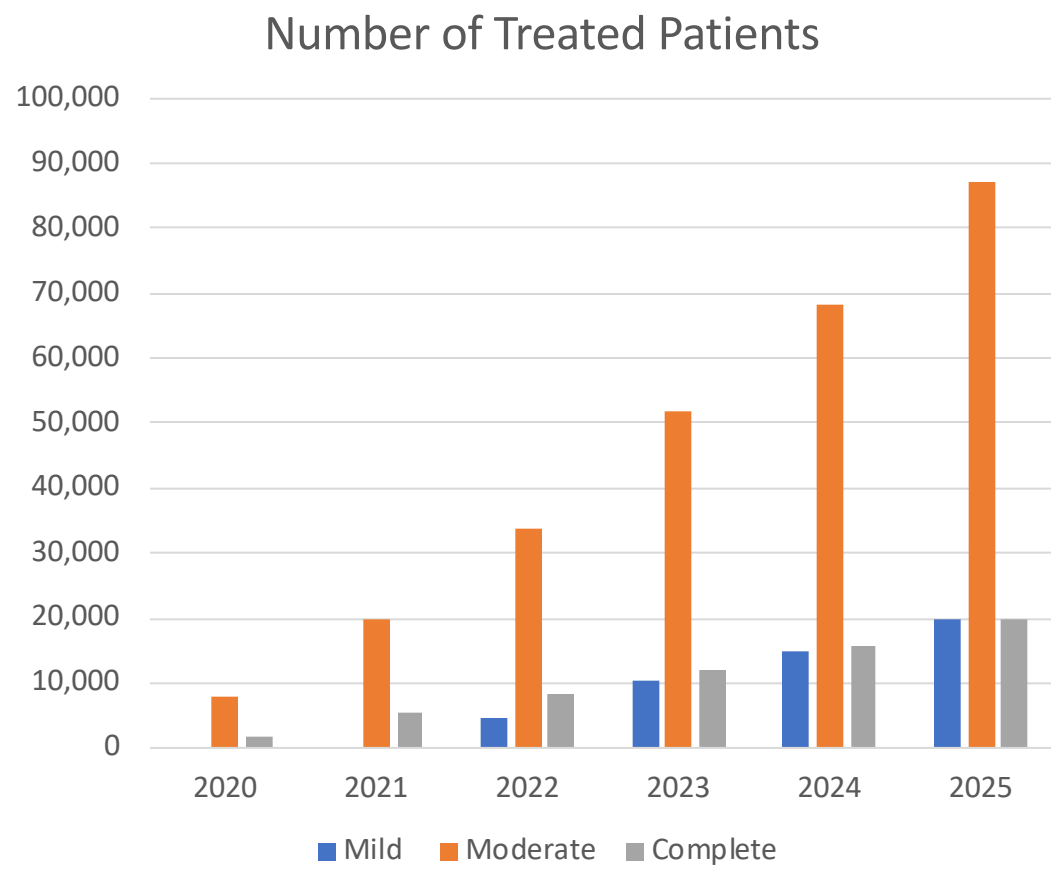


**Patient preferences** are integral to product selection and the trade-off between satisfaction and adverse events



Myostim represents a potentially **significant** and **differentiated entrant** targeting the pathophysiology of erectile dysfunction with proprietary signals

ED market exceedingly large; 40.2 million affected Americans between 35-74 years.  
A 0.24% patient penetration rate at \$1,600 per patient (2 treatments/week x 4 weeks) generates >\$200m in U.S. high margin practice revenues\*



\*Excludes use of Myostim as commercially available consumer product. European ED market (patients) > U.S. > Brazil. China has 3-4x number of ED patients as compared to the U.S.

**MyoSTIM** **ED**  
bioelectric treatment of erectile dysfunction

# Key personnel



- Howard Leonhardt, Executive Chairman and CEO
- Nestor Gonzalez-Cadavid, Chief Scientific Advisor and Professor of Urology, David Geffen School of Medicine at UCLA. Director, Urology Research Laboratory, LA Biomed at Harbor-UCLA Medical Center
- Cristiane Carboni, Chief Scientific Officer - is a physiotherapist and expert in the treatment of ED with BES. She leads studies in the UFCSPA – Brazil. She is also a professor and coordinates the Pelvic Floor PT Post graduation at Inspirar University.
- Leslie Miller MD, Chief Medical Officer
- Alex Richardson, Vice President, Engineering and Product Development
- Jorge Genovese PhD, Vice President, Bioelectric Research
- Stuart Williams PhD, Vice President, Biologics Research

## Scientific Basis of Competitive Advantage



- Bioelectrical stimulation (BES) is applied clinically for treating a variety of disorders, such as wound healing
- BES is based on safely modulating various electrical signals to stimulate or inhibit the expression of specific key genes, to counteract the known molecular pathophysiology of ED and not just induce vasodilation



Current Electrode



Current Portable Device



Future Portable Device  
Look



- Effects may potentially repair for a long-term solution: vasculature, pressure (vasoconstriction/dilation balance), nerves and penile corporal histopathology
- The first ED treatment to not just address temporary blood flow improvement but to treat muscle and nerve damage recovery



Proprietary precise bioelectric signaling affects local physiology



**SDF-1 for  
stem cell  
homing**



**IGF-1 for  
DNA  
repair**



**Follistatin  
for  
muscle  
repair**



**eNOS for  
dilating  
blood  
vessels**



**VEGF,  
PDGF,  
EGF,  
HIF1a,  
CXCL5  
and SDF1**



**DNA REPAIR AND ANTI AGING**



## Regenerative Spontaneity\*

The regeneration of smooth muscle cavernosa by BES should result in the *spontaneous return* of erectile<sup>1</sup> in contrast to the oral, injection therapy and the use of a vacuum pump where the patient is treatment dependent<sup>2</sup>

1. Stief CG. Wolrd J Urol (1995) 13:243-247.
2. Feys H. PHYS THER. 2003; 83:536-543.

- **Klotho:** the secretory Klotho results in the reduction in TNF $\alpha$  and IFN $\gamma$ , which can show anti-inflammatory properties. Klotho can interact with Wnt, which results in the inhibition of Wnt pathway activity, thus inhibiting the aging process<sup>3</sup>.
- **IGF-1:** improve nerve regeneration and neuromuscular recovery<sup>4</sup>.
- **Follistatin:** promotes muscle regeneration and recovery. Follistatin is able to accomplish accelerated muscle restoration not only by leveraging the regenerative effects of myostatin inhibition but potentially through modulating inflammation<sup>5</sup>.

3. Neurological Sciences (2018) 39:1677–1682 <https://doi.org/10.1007/s10072-018-3496-x>

4. Muscle Nerve. 2010 March ; 41(3): 335–341. doi:10.1002/mus.21485.

5. Journal of Pharmacology and Experimental Therapeutics · March 2014 DOI: 10.1124/jpet.113.211169

# Preliminary data suggestive of MyoStim ED safety and efficacy

## Statistical significance obtained in 22-patient trial!

**Table 2** Comparison between groups and intra groups regarding EHS and IIEF-5 questionnaire

Variable	Placebo			Intervention		
	Pre	Post	Diff	Pre	Post	Diff
EHS	1.64 ± 0.19	1.82 ± 0.17	.18	1.73 ± 0.13	2.82 ± 0.3*	1.1 <sup>†</sup>
IIEF-5	11.4 ± 1.3	11.4 ± 1.4	0	11 ± 1.2	16 ± 1.7*	5 <sup>†</sup>

Value are Mean ± SEM

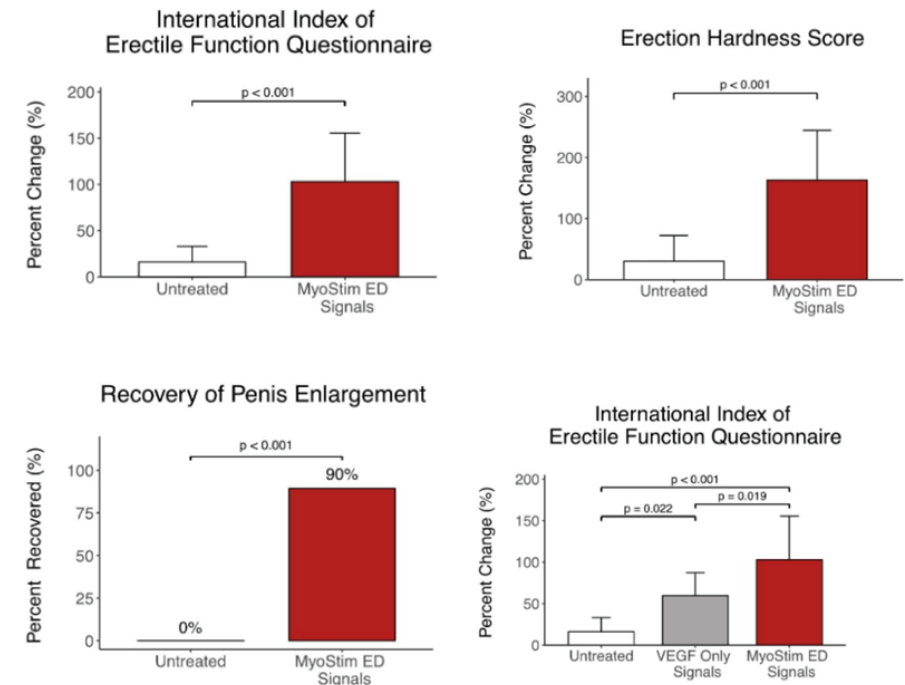
Generalized Estimating Equations Model was used to test for significant differences at different visits and time points according to each treatment

*EHS* erection hardness score, *IIEF-5* International index of erectile function-5, *Diff* mean difference post-treatment

\* $p < .0001$  from Pre in each questionnaire, <sup>†</sup> $p < 0.05$  Comparison between questionnaire changes

## Clinical Studies:

### Unpublished data



## Competitive product offerings may impact intimacy, result in local adverse events or be invasive

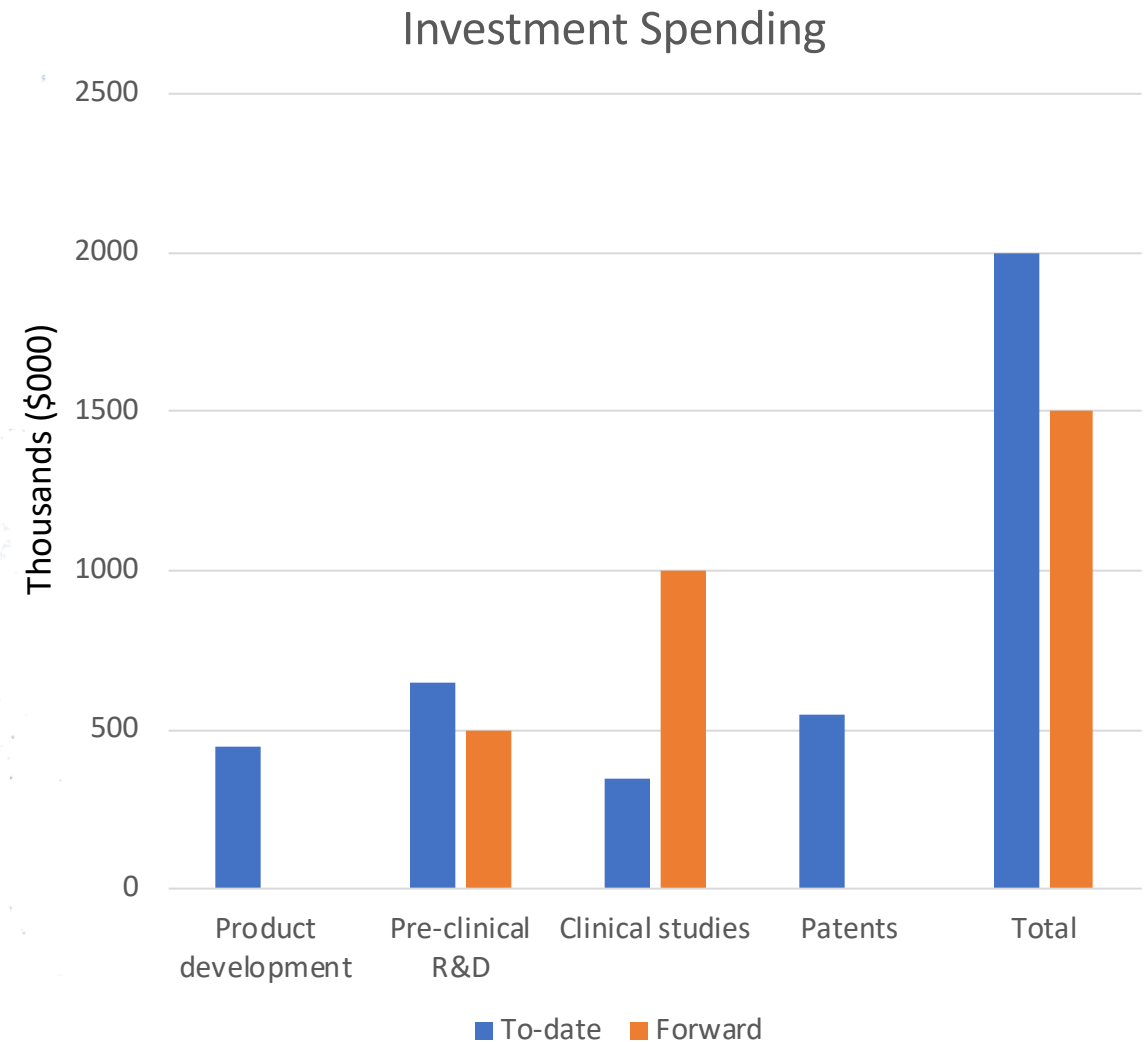
	<u>Efficacy<sup>1</sup></u>	<u>Impact on intimacy</u>	<u>Functional recovery period</u>	<u>Immediacy of effect</u>	<u>Sustainability of effect</u>	<u>Adherence</u>	<u>Safety</u>	<u>Cost</u>
<i>First-line</i>								
PDE5 inhibitors	70%	Low	NA	15-30 minutes	4-36 hours	NA	systemic side effects; drug interactions. Contra-indicated CV disease	\$25-60/pill x 40 pills/year = \$1,000-2,400/annum
<i>Second-line</i>								
Topical alprostadil <sup>2</sup>	39-75%	Moderate	NA	5-30 minutes	1 hour	Dose titration often required	Local burning, pain erythema; resolve 2 hours	
intra-urethral (IU) alprostadil (suppository)	68%	Moderate	NA	5-20 minutes	1 hour	Dose titration may be required	Penile pain (36%), urethral burning and pain (13%), erythema, bleeding	\$66/suppository
Vacuum devices	50-80%	High	NA	2-3 minutes	30 minutes	Difficult in obese men; need coordination	Numbness, pain, bruising, painful ejaculation; unnatural feeling	\$300-500/unit
Low-intensity shock-wave <sup>3</sup>	60-65% in patient subsets	None	16 weeks	Spontaneous		12 office visits x 20 minutes divided by 60-90 day break to allow vascular regrowth	Painful during administration	\$2,500-3,000; platelet rich plasma extra
<b>MyoStim ED</b>	<b>70-80%</b>	<b>None</b>	<b>4-8 weeks</b>	<b>Spontaneous</b>	<b>&gt;6 months</b>	<b>Two 45 minute office visits per week x 4-8 weeks</b>	<b>No side effects</b>	<b>\$1,600</b>
<i>Third-line</i>								
Intra-cavernosal injections	94%	High	2 session injection training	5-15 minutes	<2-4 hours	Penile injection required	wrong injection site, trauma, fibrosis, priapism	\$3-6/dose, syringes
<a href="#">Inflatable penile prosthesis (IPP)<sup>1</sup></a>	80-90%	Moderate	2-4 weeks	NA	Manual controls	Permanent	Infection, bleeding, scar tissue	\$20-30,000
<sup>1</sup> Based on patient selection criteria; Pending FDA approval; <sup>3</sup> FDA status unclear	<sup>2</sup>							

Preliminary business model assumes minimal ED population penetration, \$1,600 in practice revenues/patient and a 25% click-through payment. Excludes consumer applications for \$250 ASP (lower fidelity) device prior to retail mark-up.

U.S.		2020	2021	2022	2023	2024	2025
Year of launch		<u>t=0</u>	<u>t=1</u>	<u>t=2</u>	<u>t=3</u>	<u>t=4</u>	<u>t=5</u>
Male population: 35-74 years		77,461	77,855	78,249	78,643	79,037	79,429
x % ED		<u>51.9%</u>	<u>52.0%</u>	<u>52.0%</u>	<u>52.0%</u>	<u>52.1%</u>	<u>52.1%</u>
= ED population (000)		40,215	40,447	40,679	40,911	41,143	41,373
% Myostim as function of ED severity							
Mild (000)		14,718	14,793	14,868	14,943	15,018	15,091
x % Myostim		<u>0.00%</u>	<u>0.00%</u>	<u>0.03%</u>	<u>0.07%</u>	<u>0.10%</u>	<u>0.13%</u>
= Myostim users with mild ED		0	0	4,460	10,460	15,018	19,618
Moderate (000)		19,658	19,771	19,884	19,997	20,110	20,225
x % Myostim		<u>0.04%</u>	<u>0.10%</u>	<u>0.17%</u>	<u>0.26%</u>	<u>0.34%</u>	<u>0.43%</u>
= Myostim users with mild ED		7,863	19,771	33,803	51,992	68,374	86,968
Complete (000)		5,839	5,883	5,927	5,971	6,015	6,057
x % Myostim		<u>0.03%</u>	<u>0.09%</u>	<u>0.14%</u>	<u>0.20%</u>	<u>0.26%</u>	<u>0.33%</u>
= Myostim users with mild ED		1,752	5,295	8,298	11,942	15,639	19,988
Total ED population (000) <sup>3</sup>		40,215	40,447	40,679	40,911	41,143	41,373
x % Myostim		0.02%	0.06%	0.11%	0.18%	0.24%	0.31%
= Myostim users		9,615	25,066	46,561	74,394	99,031	126,574
x revenues/course of treatment		<u>\$1,600</u>	<u>\$1,600</u>	<u>\$1,600</u>	<u>\$1,600</u>	<u>\$1,600</u>	<u>\$1,600</u>
= Myostim MD practice revenues		\$15,384	\$40,105	\$74,497	\$119,030	\$158,449	\$202,518
x 25% click-through fee		<u>25%</u>	<u>25%</u>	<u>25%</u>	<u>25%</u>	<u>25%</u>	<u>25%</u>
= Myostim clickthrough revenue		<b>\$3,846</b>	<b>\$10,026</b>	<b>\$18,624</b>	<b>\$29,758</b>	<b>\$39,612</b>	<b>\$50,630</b>

	% Population	2016	2020	2025	2030
35-44 population		20,564	21,567	22,508	23,074
Complete	3%	617	647	675	692
Moderate	<u>18%</u>	<u>3,702</u>	<u>3,882</u>	<u>4,051</u>	<u>4,153</u>
Subtotal	21%	4,318	4,529	4,727	4,846
Mild	<u>19%</u>	<u>3,907</u>	<u>4,098</u>	<u>4,277</u>	<u>4,384</u>
Total	40%	8,226	8,627	9,003	9,230
45-54 population		21,755	19,845	19,739	19,675
Complete	6%	1,305	1,191	1,184	1,181
Moderate	<u>23%</u>	<u>5,004</u>	<u>4,564</u>	<u>4,540</u>	<u>4,525</u>
Subtotal	29%	6,309	5,755	5,724	5,706
Mild	<u>19%</u>	<u>4,133</u>	<u>3,771</u>	<u>3,750</u>	<u>3,738</u>
Total	48%	10,442	9,526	9,475	9,444
55-64 population		19,350	20,903	20,167	20,315
Complete	9%	1,742	1,881	1,815	1,828
Moderate	<u>29%</u>	<u>5,612</u>	<u>6,062</u>	<u>5,849</u>	<u>5,891</u>
Subtotal	38%	7,353	7,943	7,664	7,720
Mild	<u>19%</u>	<u>3,677</u>	<u>3,972</u>	<u>3,832</u>	<u>3,860</u>
Total	57%	11,030	11,915	11,495	11,580
65-74 population		13,015	15,146	17,015	18,559
Complete	14%	1,822	2,120	2,382	2,598
Moderate	<u>34%</u>	<u>4,425</u>	<u>5,150</u>	<u>5,785</u>	<u>6,310</u>
Subtotal	48%	6,247	7,270	8,167	8,908
Mild	<u>19%</u>	<u>2,473</u>	<u>2,878</u>	<u>3,233</u>	<u>3,526</u>
Total	67%	8,720	10,148	11,400	12,434
35-74 population		74,684	77,461	79,429	81,623
Complete		5,486	5,839	6,057	6,299
Moderate		<u>18,742</u>	<u>19,658</u>	<u>20,225</u>	<u>20,880</u>
Subtotal		24,228	25,497	26,281	27,179
Mild		<u>14,190</u>	<u>14,718</u>	<u>15,091</u>	<u>15,508</u>
Total		38,418	40,215	41,373	42,687
% mix					
Complete		7.3%	7.5%	7.6%	7.7%
Moderate		<u>25.1%</u>	<u>25.4%</u>	<u>25.5%</u>	<u>25.6%</u>
Subtotal		32.4%	32.9%	33.1%	33.3%
Mild		<u>19.0%</u>	<u>19.0%</u>	<u>19.0%</u>	<u>19.0%</u>
Total		51.4%	51.9%	52.1%	52.3%

Myostim ED:  
BES platform  
leverage,  
productivity and  
proof of concept





## Capital Raise & Milestones

- 3,000,000 shares authorized.
- **Selling 66,667 shares at \$15 per share**
- **Valuation \$45 million**

# 63X

ROI Over Seed  
Stage \$1

Target ROI over time with  
3% royalty on sales



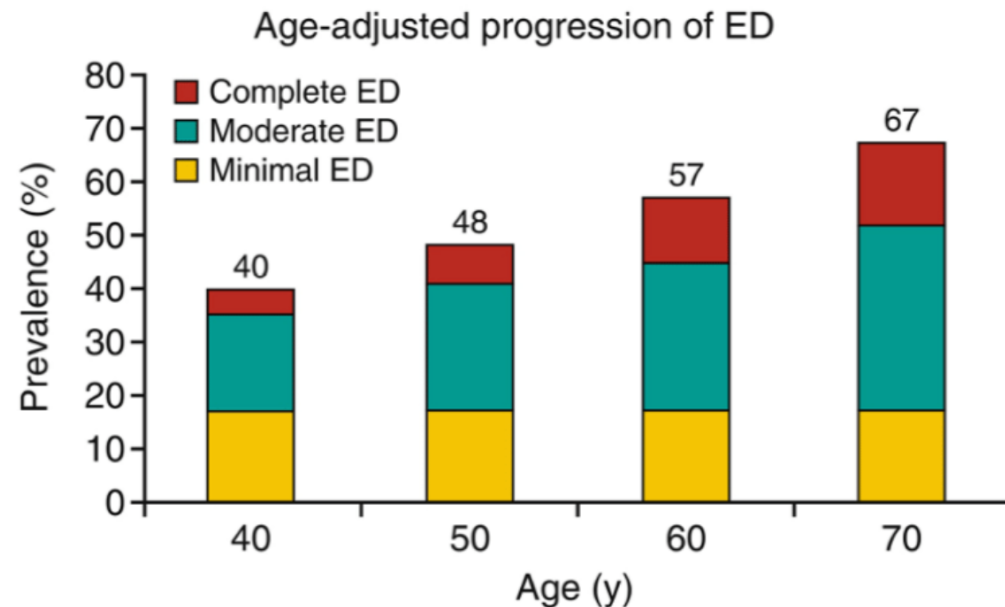
- This capital gets us through first-in-man studies and into a strategic partnership exit.

# Appendix

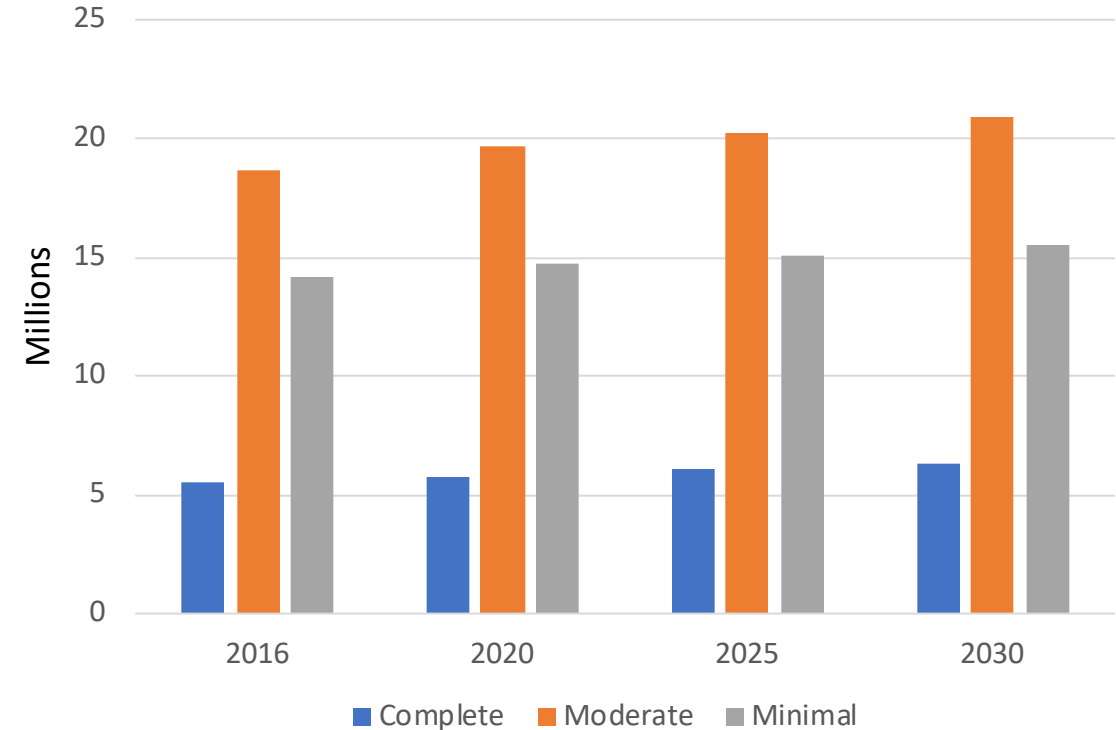
# Erectile dysfunction is very common, especially in the aging population

**Moderate and incomplete ED progression is 2x more common in smokers<sup>1,2</sup>**

Major Risk Factors for ED: Aging

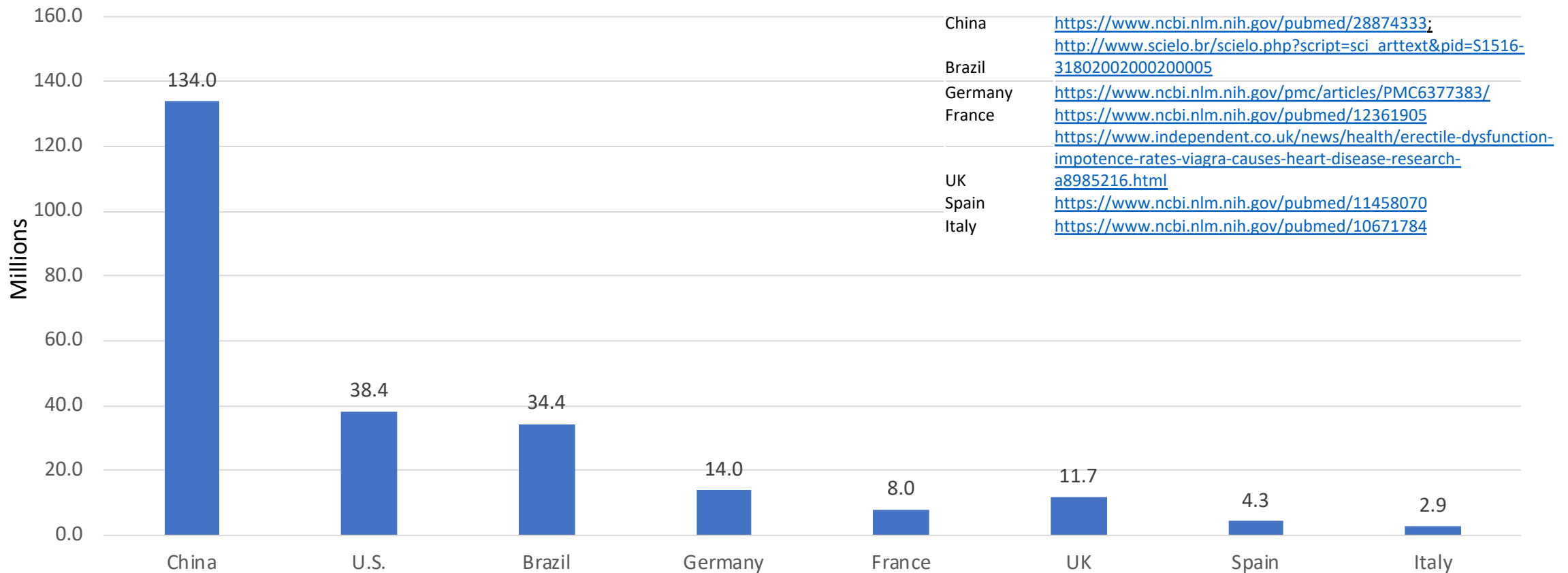


**Number with erectile dysfunction (est.)<sup>3</sup>**



<sup>1</sup>Pathophysiology of Erectile Dysfunction, Penn Clinical Manual of Urology <https://www.progressivemenshealth.com/age-major-risk-factor-erectile-dysfunction-2/>. Feldman HA, Johannes CB, Derby CA, et al. Erectile dysfunction and coronary risk factors: Prospective results from the Massachusetts male aging study. PrevMed 2000; 30:328. <sup>2</sup> <https://www.ncbi.nlm.nih.gov/pubmed/10731462> <sup>3</sup>Calculated based on U.S. census projections by age

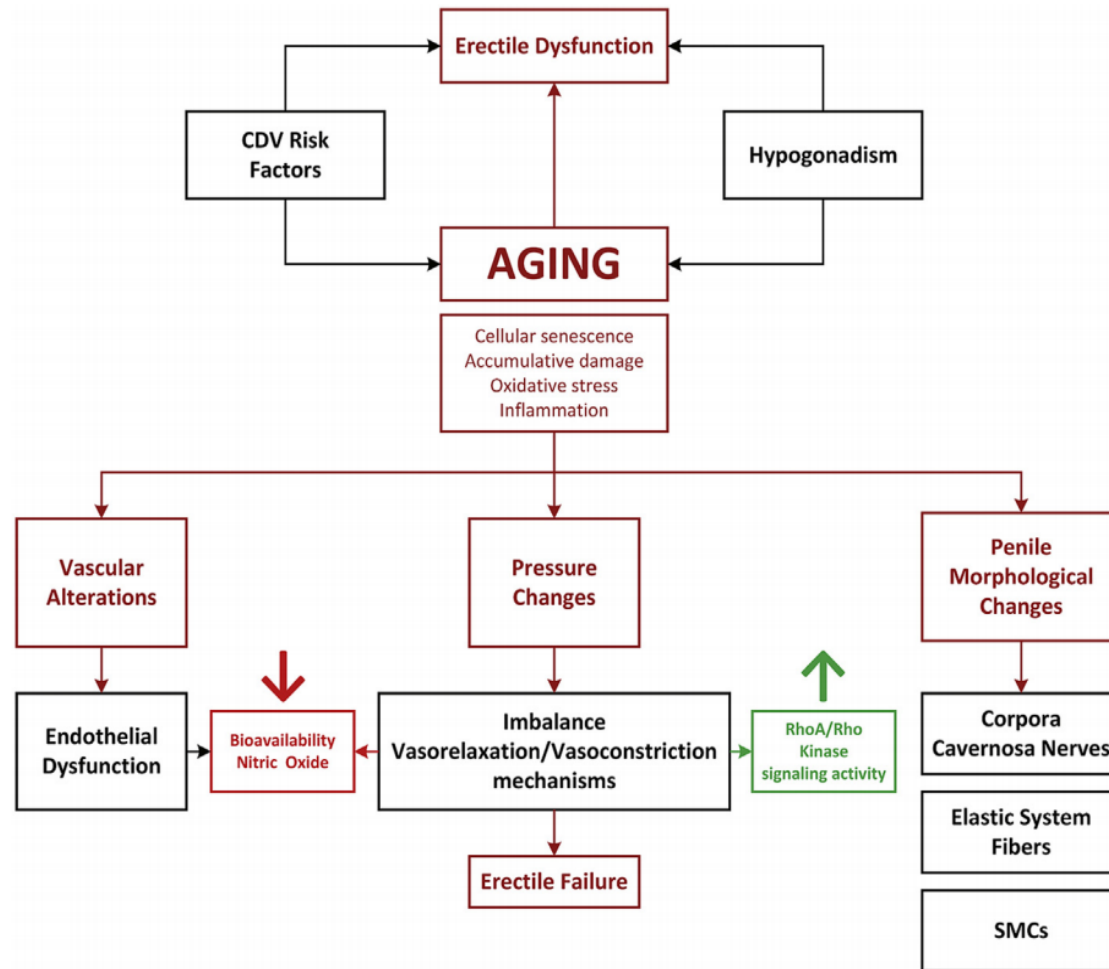
# Erectile dysfunction is a global issue projected to affect 332 million people by 2025<sup>1</sup>



<sup>1</sup>J.B. McKinlay. The worldwide prevalence and epidemiology of respective PDEs, could achieve greater enhance-erectile dysfunction  
Int J Impot Res, 2 (Suppl. 4) (2000), pp. S6-S11

\*Reporting by market may vary based on survey methodology, willingness to admit sexual issues, age distribution of population, etc.

## Pathophysiology of aging and erectile dysfunction



**Figure 1.** There are morphologic and physiologic mechanisms involved in the process of aging that play a key role in the development of sexual dysfunction. Cardiovascular risk factors and hypogonadism have a critical impact during the establishment of the aging process that could also lead to erectile dysfunction. Cellular senescence could induce oxidative stress and hence inflammation that with time leads to accumulative damage. With this overview, the main mechanisms of the aging process that drive toward erectile dysfunction include vascular and physiologic alterations and penile morphologic changes.

# Erectile dysfunction is associated with aging, chronic diseases, medications and behavioral health

## ED associations<sup>1</sup>

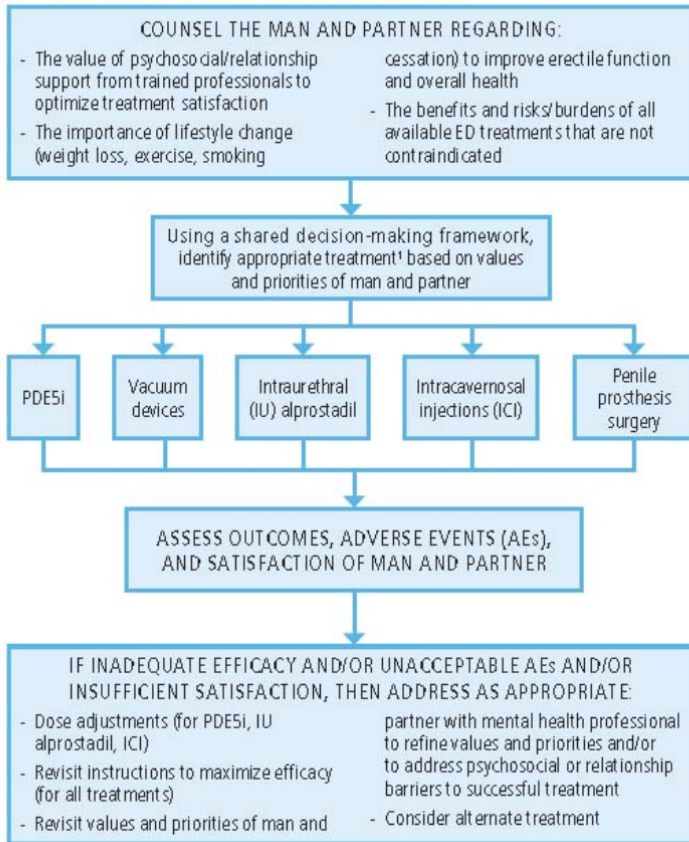
- Age
- Hypertension
- Cardiovascular disease
  - Coronary artery disease, stroke, peripheral vascular disease
- Depression
- Diabetes
- Neurological disease
  - Parkinson's Disease, Multiple Sclerosis
- Medications for hypertension, diabetes, etc.
- Psychological factors (10-20% of cases)
- Post-surgical complications
  - Radical prostatectomy, TURP

## Diabetes & Erectile Dysfunction <sup>2,3</sup>

- 30.3 million Americans have diabetes; 9.4% population and 25.2% seniors. Approximately 1.5 million new cases per year
- “In the Massachusetts Male Aging Study, diabetic men showed a threefold probability of having ED when compared to men without diabetes; moreover, the age-adjusted risk of ED doubled in diabetic men when compared to those without diabetes.
- The occurrence of ED is 10–15 years earlier in men with diabetes; moreover, ED is more severe and less responsive to oral drugs in diabetes, leading to reduced quality of life.”

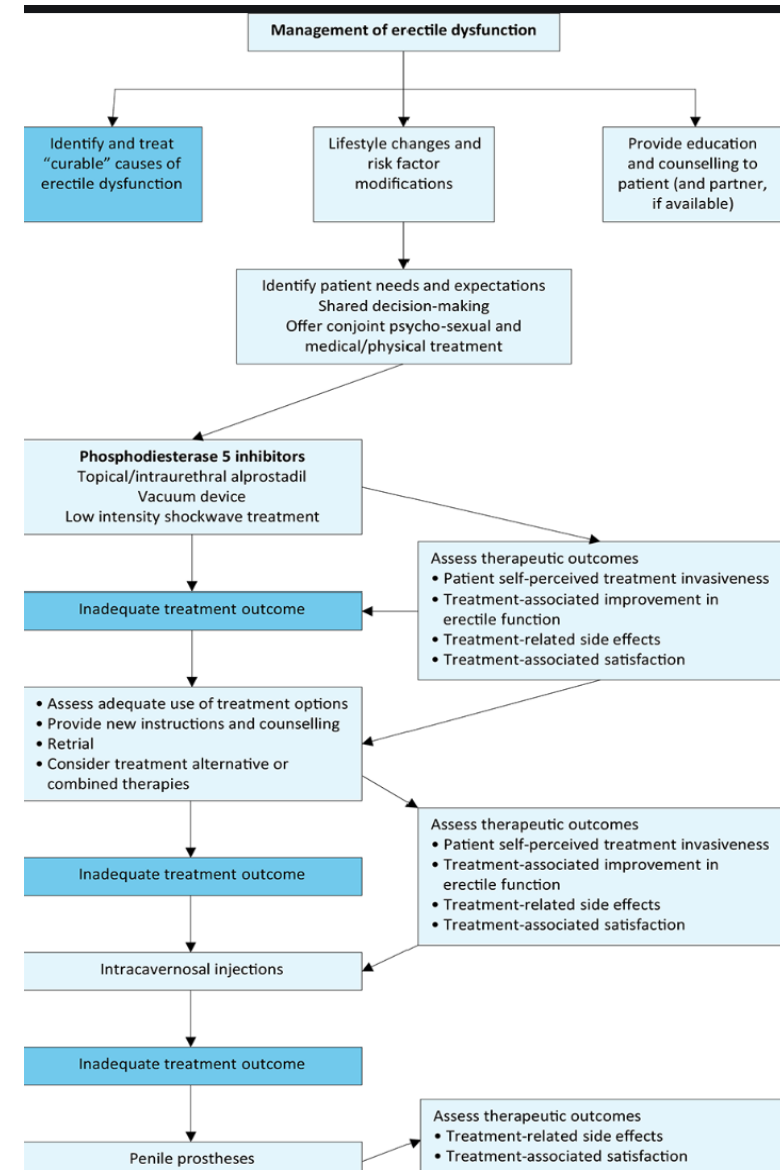
Treatment algorithms established by American Urology Association and European Association of Urology based on severity of ED, outcomes, adverse events and satisfaction. Patient preferences noted.

### ERECTIONAL DYSFUNCTION ALGORITHM



<sup>1</sup>For men with testosterone deficiency, defined as the presence of symptoms and signs and a total testosterone <300 ng/dl, counseling should emphasize that restoration of testosterone levels to therapeutic levels is likely to increase efficacy of ED treatments other than prosthesis surgery.

European Association of Urology

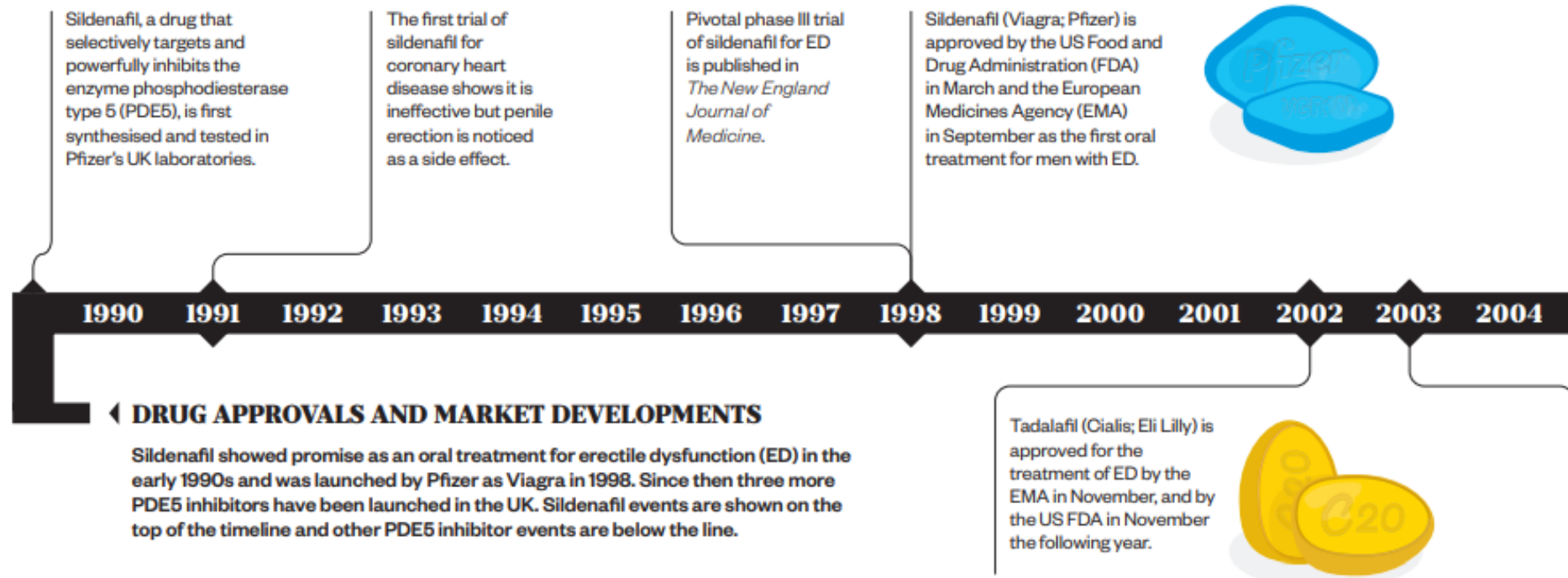


# THREE DECADES OF VIAGRA

*Sildenafil (Viagra) – the first oral drug for erectile dysfunction to hit the market in 1998 – has been prescribed for more than 64 million men worldwide, and may soon be reclassified as a pharmacy medicine in the UK.*

BY DAWN CONNELLY & ALISDAIR MACDONALD

Erectile dysfunction market development exceeding 30 years!



## INFOGRAPHIC



37.0m

**2008**

By 2008, Viagra had been prescribed for more than 37 million men worldwide



64.0m

**2016**

By 2016, Viagra had been prescribed for more than 64 million men worldwide



5.4bn

**2016**

5.4 billion Viagra tablets had been dispensed worldwide by 2016

Pfizer withdraws an application to the EMA to market Viagra over the counter for ED after the regulator expresses concerns that there would be no medical supervision, which could delay diagnosis of possible cardiovascular disease.

Boots becomes the first UK pharmacy to offer Viagra without a prescription under a patient group direction.

Tesco breaks into the Viagra market and offers the drug to customers without a prescription under a patient group direction.

The UK patent on Viagra expires, opening the way for generic versions of sildenafil to be launched.

Generic sildenafil can now be prescribed on the NHS for any male with ED, whereas previously it was restricted to those with ED because of an underlying health condition, such as diabetes or prostate cancer.

The Medicines and Healthcare products Regulatory Agency (MHRA) recommends sildenafil 50mg (Pfizer) should be available as a pharmacy medicine, and launches a consultation that closes in April.

2005

2006

2007

2008

2009

2010

2011

2012

2013

2014

2015

2016

2017

Vardenafil (Levitra; Bayer) is approved by the EMA for the treatment of ED in March and the US FDA in August.



The European Commission approves low-dose (2.5mg and 5.0mg) tadalafil as single-daily ED therapy.

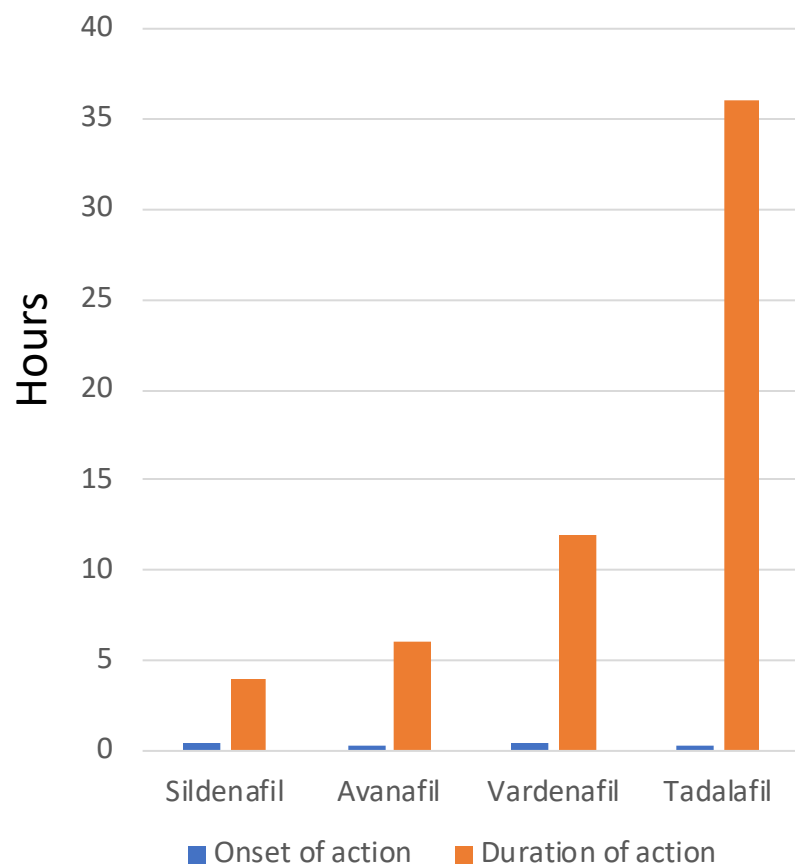
Vardenafil (10mg) is the first PDE5 inhibitor introduced for ED in an orodispersible tablet.

Avanafil (Spedra; Vivus) is approved for treatment of ED by the US FDA in April and by the EMA in June 2013.

Manufacturer of Cialis, Lilly, agrees a deal with Sanofi to allow the French firm to buy exclusive rights to apply to sell Cialis as a non-prescription medicine in Europe, the United States, Canada and Australia after certain patents expire.




First line of treatment, PDE-5 Inhibitors, do NOT meet the needs of all patients



Efficacy: Successful intercourse for general ED population  
<https://www.pharmaceutical-journal.com/download?ac=1072931>


**Sildenafil**  
Viagra



**EFFICACY: 69%**

- ▶ **Recommended dose:** 50mg, 1 hour before sexual activity, may be adjusted to 100mg or 25mg
- ▶ **Bioavailability:** 41%
- ▶ **Time to peak plasma levels:** 60 minutes
- ▶ **Half-life:** 3–5 hours
- ▶ **Onset of action:** 25 minutes
- ▶ **Duration of action:** up to 4 hours
- ▶ **Food:** high-fat meals delay the time to peak plasma concentration by 60 mins and reduce peak plasma levels by 29%
- ▶ **Common side effects:** headache, dizziness, flushing, nasal congestion, nausea, dyspepsia, visual abnormalities


**Vardenafil**  
Levitra



**EFFICACY: 71–80%**

- ▶ **Recommended dose:** 10mg, 25–60 minutes before sexual activity. May be adjusted to 20mg or 5mg (film-coated only)
- ▶ **Bioavailability:** 15%, (film-coated), 19% (orodispersible)
- ▶ **Time to peak plasma levels:** 60 minutes (film-coated), 45–90 minutes (orodispersible)
- ▶ **Half-life:** 4–5 hours
- ▶ **Onset of action:** 25 minutes
- ▶ **Duration of action:** up to 12 hours
- ▶ **Food:** high-fat meals delay the time to peak plasma concentration by 60 mins (film-coated) and reduce peak plasma levels by 20% (film-coated) or 35% (orodispersible)
- ▶ **Common side effects:** headache, dizziness, flushing, nasal congestion, dyspepsia. Inhibits PDE6, which can cause transient visual abnormalities. Can prolong QTc interval


**Tadalafil**  
Cialis



**EFFICACY: 75%**

- ▶ **Recommended dose:** 10mg, 30 minutes before sexual activity, may be adjusted to 20mg; or 2.5–5.0mg daily
- ▶ **Bioavailability:** not determined
- ▶ **Time to peak plasma levels:** 120 minutes
- ▶ **Half-life:** 17.5 hours
- ▶ **Onset of action:** 15–30 minutes
- ▶ **Duration of action:** up to 36 hours
- ▶ **Food:** rate and extent of absorption are not influenced by food
- ▶ **Common side effects:** headache, flushing, nasal congestion, dyspepsia, myalgia and back pain

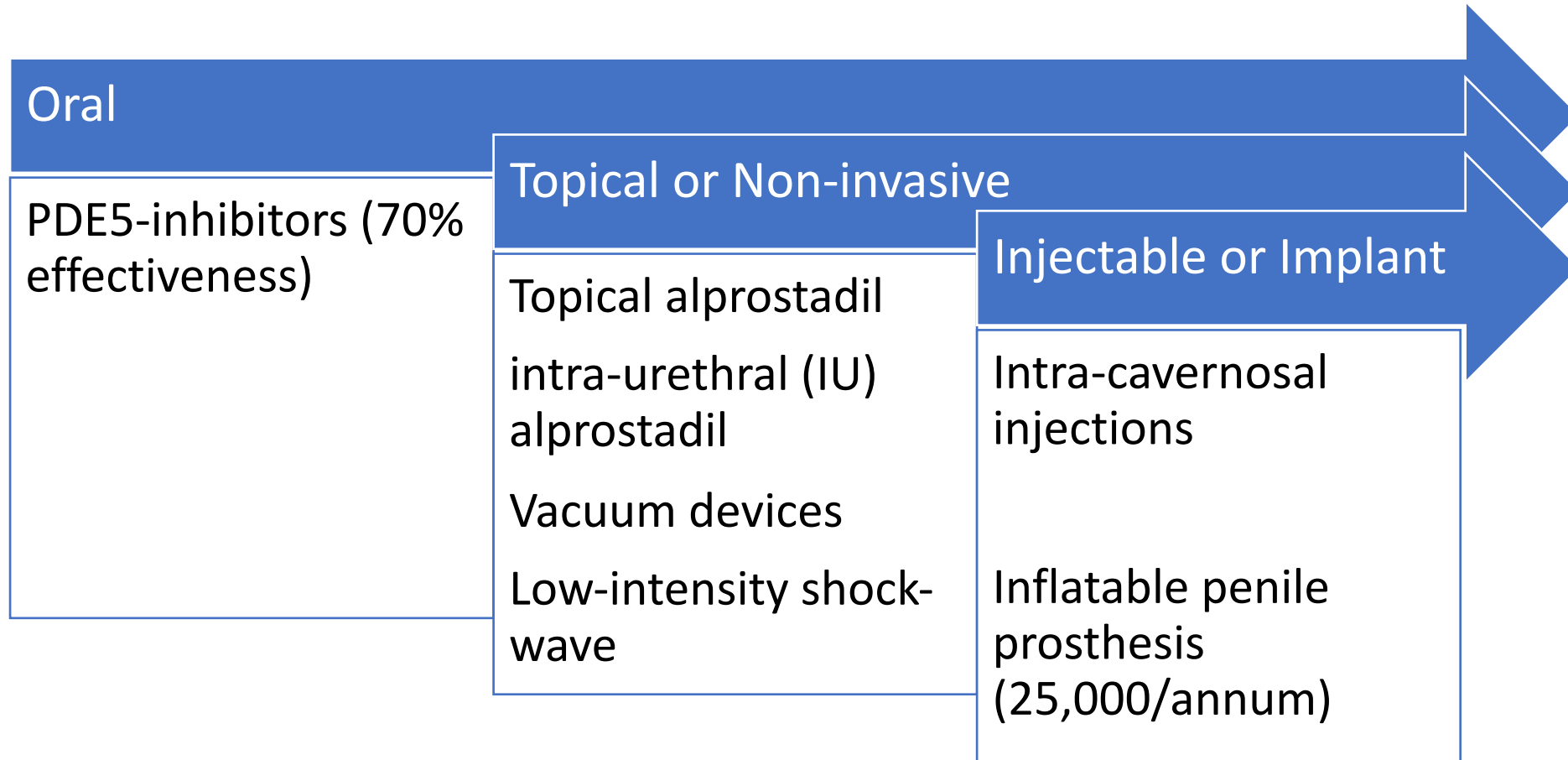
**Avanafil**



**EFFICACY: 47–59%**

- ▶ **Recommended dose:** 100mg, 15 to 30 minutes before sexual activity, may be adjusted to 200mg or 50mg
- ▶ **Bioavailability:** not determined
- ▶ **Time to peak plasma levels:** 30–45 mins
- ▶ **Half-life:** 6–17 hours
- ▶ **Onset of action:** 15–30 minutes
- ▶ **Duration of action:** up to 6 hours
- ▶ **Food:** high-fat meals delay the time to peak plasma concentration by 75 mins and reduce peak plasma levels by 39%
- ▶ **Common side effects:** headache, flushing, nasal congestion

Alternative treatment modalities may be inappropriate, ineffective or associated with adverse events



Note: Intra-cavernous injections may include phentolamine, papaverine, and alprostadil. *It's an* invasive procedure that is associated with dropout rates as high as 40%–50% due to pain, priapism, penile fibrosis, hematoma, ecchymosis, or fear of the needle

# Oral and topical ED therapies have limitations

Limitations and adverse events of erectile dysfunction (ED) treatment with phosphodiesterase type 5 (PDE5) inhibitors

Limitation	Adverse event
Systemic side effects	<ul style="list-style-type: none"> <li>• Headache</li> <li>• Visual disturbance</li> <li>• Priapism</li> <li>• Flushing</li> <li>• Muscular pain</li> <li>• Dyspepsia</li> <li>• Sinus congestion</li> </ul>
Drug interactions	<ul style="list-style-type: none"> <li>• Variable efficacy as a result of increased/decreased PDE5 inhibitor plasma concentration</li> </ul>
<ul style="list-style-type: none"> <li>• Inhibitors/inducers of P-450<sup>*</sup></li> <li>• Antihypertensive agents</li> <li>• Alpha-blockers<sup>**</sup></li> <li>• Nitrates</li> </ul>	<ul style="list-style-type: none"> <li>• Enhanced variable efficacy</li> <li>• Severe hypotension</li> </ul>
Decreased absorption with fatty meals	<ul style="list-style-type: none"> <li>• Decreased efficacy</li> <li>• Loss of spontaneity</li> </ul>

## Notes:

<sup>\*</sup> Cytochrome P-450 inhibitors;

<sup>\*\*</sup> alpha-blockers are used for the treatment of hypertension and benign prostatic hyperplasia.

Study	Design	Patient population	Topical alprostadil dosage	Efficacy	Treatment-related adverse events <sup>a</sup>	
Goldstein et al <sup>37</sup>	Phase I: RCT [1:1]	n=60 31, alprostadil 29, placebo	1% alprostadil + 5% SEPA	Improvement in vaginal penetration: 12/31 (39%) in alprostadil vs 2/29 (7%) in placebo, $P<0.005$	30% - placebo 50% - alprostadil	
Padma-Nathan et al <sup>38</sup>	Phase II: multicenter, double-blind, placebo-controlled RCT [3:1]	n=303 161 (study 1) - mild-to-moderate ED <sup>b</sup> 121, alprostadil 40, placebo 142 (study 2) - severe ED <sup>c</sup> 107, alprostadil 35, placebo	Study 1 - 50, 100, or 200 µg Study 2 - 100, 200, or 300 µg	Change in EF domain of IIEF from baseline: Study 1: $3.7\pm1.2$ in alprostadil vs. $-0.8\pm1.1$ in placebo, $P<0.01$ Study 2: $9.4\pm1.5$ in alprostadil vs. $2.7\pm1.3$ in placebo, $P<0.01$	Study 1: 53% - placebo 67% - 50 µg 67% - 100 µg 78% - 200 µg Discontinuation due to AE: 14%	Study 2: 11% - placebo 30% - 100 µg 60% - 200 µg 51% - 300 µg Discontinuation due to AE: 11%
Padma-Nathan et al <sup>40</sup>	Phase III: multicenter, double-blind, placebo-controlled, long-term <sup>d</sup> RCT [3:1]	n=1,732 1,298, alprostadil 434, placebo	100, 200, or 300 µg	Change in EF domain of IIEF from baseline ( $P<0.001$ ): 1.6 for 100 µg 2.5 for 200 µg 2.4 for 300 µg -0.7 for placebo	12% - placebo 46% - 100 µg 62% - 200 µg 67% - 300 µg Discontinuation due to AE: 2.7%	
Rooney et al <sup>44</sup>	Open label: multicenter, long-term <sup>e</sup> study	n=1,101	Before titration: 1,101, 200 µg After titration: 25, 100 µg 124, 200 µg	Change in EF domain of IIEF from baseline ( $P<0.001$ ): 13.0 for 100 µg 13.2 for 200 µg 10.1 for 300 µg	Before titration: 23% - 200 µg After titration: 36% - 100 µg 42% - 200 µg 34% - 300 µg Discontinuation due to AE: 4.3%	

## Notes:








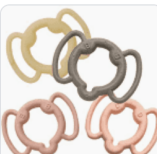

<sup>a</sup>Treatment-related adverse events (AEs) usually included penile burning, genital pain, and erythema, which resolved within 2 hours;

<sup>b</sup>mild-to-moderate ED defined as IIEF 14-21;

<sup>c</sup>severe EF defined as IIEF <14;

<sup>d</sup>long term defined as 3 months in this study;

# Vacuum devices are effective in 50-80% of patient but have side effects and other possible drawbacks

 <p>Osbon Erecaid Esteem Manual... \$229.95 Erecaidpumps.c... Free shipping</p>	 <p>Encore Deluxe Vacuum Therap... \$125.00 Encore Online S... Free shipping</p>	 <p>Vacurect 1002 OTC VED Erectio... \$195.00 Mainspring Medi... Free shipping</p>
 <p>Pos T Vac Ultra Max: Erectile... \$179.00 Rejoyn Medical</p>	 <p>Osbon Erecaid Tension Rings b... \$18.95 Erecaidpumps.c... Free shipping</p>	 <p>Vacurect 1002 OTC VED Pump \$194.25 HealthConnection Free shipping</p>
 <p>Pos-T-Vac Bos2000-2... \$175.00</p>	 <p>Timm Osbon 1610 ErecAid... \$24.93</p>	 <p>Vacurect 1002 OTC VED Deluxe... \$275.00</p>

## Side effects

Side effects of using a penis pump can include:

- **Pinpoint-sized red dots (petechiae).** This is caused by bleeding under the surface of the skin of the penis.
- **Numbness, coldness or bluish-colored skin.** This can occur when the constriction band is in place.
- **Pain or bruising.** Knowing how to use the penis pump correctly can help you avoid injury to your penis.
- **Feeling of trapped semen.** You might feel like your semen is trapped when you ejaculate, or ejaculation might be painful. Some manufacturers make constriction rings with a small cutout that might help with this.

Penis pumps have some other possible drawbacks:

- **Unnatural-feeling erections.** Penis pumps can cause an erection that doesn't feel natural or spontaneous. You might have a lack of firmness at the base of the penis, which can allow the penis to rotate or pivot more than it would with a natural erection.
- **Awkwardness.** Use of a penis pump requires patience and understanding from both you and your partner. It might take some time to become comfortable with the device.
- **Manual coordination is required.** Penis pumps require use of the hands and fingers to operate, which can be a problem for some men or their partners.

Shockwave therapies are effective in 60-65% of patients at one month; treatment is expensive and inconvenient (\$3,000 x 10-12 sessions).  
It is NOT FDA approved for this indication

The researchers found that at one month, treatment was successful in 99 patients (63.5%), but during follow-up a gradual decrease in efficacy was observed. At 2 years, the beneficial effect was maintained in only 53.5% of patients in whom success was initially achieved. Over follow-up the treatment effect was lost in all patients with diabetes who initially had severe erectile dysfunction. However, for patients with milder forms of erectile dysfunction without diabetes there was a 76% chance that the beneficial effect of low-intensity shock wave treatment would be preserved after 2 years.