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TREATMENT OF ERECTILE DYSFUNCTION:

A REVIEW OF LITERATURE AND NATIONAL SURVEY OF UROLOGISTS

A Thesis

Submitted

in Partial Fulfillment

of the Requirements for the Designation of

University Honors

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This Study by: **Mark Thomsen**

Entitled: TREATMENT OF ERECTILE DYSFUNCTION: A REVIEW OF
LITERATURE AND NATIONAL SURVEY OF UROLOGISTS

has been approved as meeting the thesis or project requirement for the Designation

University Honors with Distinction or University Honors (select appropriate designation)

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5/31/05

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ABSTRACT

The treatment of erectile dysfunction has improved dramatically over the past decade, including the revolutionary introduction of PDE-5 inhibitors (i.e. sildenafil citrate or Viagra). As improved treatments have been presented to the public, an increasing number of men are seeking treatment for ED. This national survey of urologists is intended to address specific questions regarding how urologists make decisions in treating erectile dysfunction. In addition to conventional areas of interest, such as the impact of side effects and determining the motivation for ED patients to seek treatment, this survey addresses how the treatment of ED relates to the specific condition causing the loss of erectile function. This survey also questions if and when second line strategies are preferred for primary treatment of erectile dysfunction, and whether patients prefer short or long-term treatment options. A review of current clinical literature is provided to both support and question the results of this survey. Primary findings were that certain treatments were preferred for certain root causes of erectile dysfunction. Results also indicated that referrals from healthcare providers and word of mouth were the top two factors influencing patients to seek treatment of ED by a urologist. Other survey findings are presented in the following sections.

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INTRODUCTION

Erectile dysfunction, or ED, is a condition that affects up to 30 million men of various ages in the US, and 150 million men worldwide. Also referred to as impotency, ED is defined as the inability to achieve or maintain an erection that is sufficient for satisfactory completion of sexual intercourse.[1] While this definition may seem ambiguous the International Index of Erectile Function (IIEF) has been adopted as a standard questionnaire to allow for the quantification of ED symptoms for each individual patient. The IIEF has allowed researchers to determine the success of various treatment strategies during clinical research projects.[2]

Erectile dysfunction is commonly associated with numerous diseases and conditions, many of which are listed in Figure 1. In some patients several of the conditions listed can contribute to partial or complete ED. For example, an older male smoker may show symptoms of heart disease, leading to the prescription of a daily regimen of medications; this patient would then display four of the potential causes of ED listed. It is also important to note that the conditions listed do not always lead to ED, and that certain causes, including obesity, are still debated as being directly linked with erectile function. One of the primary objectives of this survey is to determine whether the specific causes of ED listed below are more commonly associated with the prescription of specific treatment options. This correlation will also be examined in light of recent clinical research in the review of literature section.

A patient is usually diagnosed with erectile dysfunction during an appointment with a physician, often a primary care physician or urologist. One of the objectives of this survey is to determine what factors influence a patient seeking treatment for ED, as well as the extent to which these factors influence behavior. Specifically, this survey questions which of the several factors provided are most influential in a patient seeking the opinion of a urologist.

Table 1: Potential root causes of erectile dysfunction (revised from Rahman, et. al.)[3]

Category of ED	Conditions associated with ED
Psychological	**Depression** **Schizophrenia** **Performance anxiety** **Stress** **Relationship problems**
Neurogenic	**Stroke** **Pelvic injury** **Pelvic surgery (ex: radical prostatectomy)** **Radiation therapy** **Spinal cord injury** **Diabetic neuropathy**
Vascular	**Atherosclerosis** **Smoking** **Hypertension** **Diabetes** **Trauma** **Pelvic surgery, injury, or radiation** **Peyronie's disease**
Hormonal	**Hypogonadism (low Testosterone)** **Hypergonadism (high Testosterone)**
Drug Induced	**Medicinal side effects** (anti-hypertensives, anti-depressants) **Excessive alcohol consumption**
Other Associated Conditions or Diseases	**Older age** **Diabetes** **Chronic renal failure** **Obesity** **Peripheral vascular disease** **Heart disease**

Following diagnosis, a physician usually presents the patient with options regarding treatment. At this point each physician approaches the treatment of ED differently, as some may present the options and recommend an appropriate strategy, while others leave the treatment decision entirely up to the patient. This general observation might be a starting point for future research into the decision making process of patients and physicians in regards to the treatment of erectile dysfunction.

As with treatments for many other conditions, each treatment for ED has advantages and disadvantages, as well as the potential for side effects. The various treatment options are listed in Figure 2, along with the most common side effects. An objective of this survey was to determine the extent that the potential for side effects impacted decisions regarding treatment of ED.

Table 2: Possible side effects associated with treatment options (altered from Rahman, et. al.)[4]

Treatment Strategy	Most common side effects
Oral Medication (Viagra, Levitra, Cialis)	Headache Flushing Dyspepsia, Nasal congestion Urinary tract infection Abnormal color vision Blurred vision Diarrhea Dizziness Rash Drop in blood pressure Priapism Life-threatening complications in patients taking nitrates or alpha blockers
Intracavernous Injection Therapy	Penile pain Priapism Penile fibrosis (scar tissue) Penile hematoma
Penile Prosthesis	Risks associated with surgery Risk of infection Needs periodic replacement
Vacuum Erection Device	Bruising Petechiae Coldness or numbness Discomfort of constriction band Decreased ability to achieve orgasm
Intra-Urethral Suppository (*MUSE*)	Penile pain Fainting Dizziness Priapism

Another objective of this survey was to validate the observation that these treatment options can be segmented into first and second line treatments. Specifically, clinical reviews indicate that oral medications are typically a first line treatment following diagnosis regardless of whether the patient or physician makes the treatment decision. Sources then indicate that other

treatment options, including vacuum erection devices, intracavernous injection therapy, and intra-urethral suppository are all considered second line treatments.[5] This survey was designed to determine whether urologists use a set protocol to move from first to second line treatment options. Furthermore, this survey questioned if and when second line treatments were appropriate for first line of treatment.

The role of the sales professional in the treatment of erectile dysfunction varies for each of the treatment options listed in Figure 2. While some representatives attempt to persuade physicians on the basis of short conversations, often referred to as detailing, others make a concerted effort to contribute to the continuing education of physicians by presenting the latest clinical research. An objective of this survey is to gain insight into the extent to which physicians use sales professionals as resources in staying current with ongoing research. Free response questions are used to determine where urologists acquire recent clinical studies and to what extent these studies affect patient care. The results of this survey will then give rise to future research designed to determine the best role of the sales professional in a urology office.

In addition to their interaction with physicians, some sales professionals frequently interact with patients for the purpose of training them in the proper use of their product. In some cases, sales personnel become an extension of the medical facility by filling the patient training role previously reserved for nursing staff or other health care providers. This role is important, as sales professionals offer these services to improve the chances that their products will be used correctly by patients on a consistent basis. An objective of this survey was to test which treatment strategies are currently being used correctly on a consistent basis, and in effect test which products required this additional training.

As mentioned earlier, the International Index of Erectile Function (IIEF) has been adopted to effectively quantify the satisfaction of patents in several domains regarding erectile function. One of the limitations of this tool, and of many clinical research projects, is that it is unclear whether patients suffering from ED are more concerned with life long treatment or short term remedies. This survey presented this question directly to urologists, asking whether their patients were more concerned with short-term or long-term solutions to erectile dysfunction. However, a survey of patients may also be appropriate in addressing this question.

In summary, the objectives of this national survey of urologists included determining whether specific causes of ED are more commonly associated with the prescription of specific treatment options and determining which treatments correspond to which root causes for both the first and second choice of the prescribing urologist. The survey also focused on the factors that influence a patient to seek treatment for ED, as well as the extent to which these influences alter behavior. In addition, the survey attempted to determine whether urologists used a set protocol to move from first to second line treatment options and if these second line treatments were prescribed as primary treatment options in certain situations. The survey also asked whether urologists believe that patients are more concerned with short-term or long-term solutions to erectile dysfunction. Another objective was to test which treatment strategies are currently being used correctly on a consistent basis, and, in effect, test which products require additional training, either by office staff or by sales professionals. Finally, the survey asks urologists to quantify the impact of side effects on decisions regarding the treatment of ED.

SIX HYPOTHESISES OF THE STUDY

It was hypothesized that specific causes of erectile dysfunction would correspond with specific treatment options, especially in patients following radical prostatectomy. It was predicted that vacuum constriction devices and intracavernous injections would appear as viable first line treatment options for these patients. Secondly, it was hypothesized that advertisements would be the second most important influence on patients seeking treatment for ED, next to referral by another physician. The third hypothesis predicted that urologists used a set protocol or stepwise process to move from first to second line treatments in patients frustrated with initial treatment. The fourth hypothesis was that patients would prefer long-term treatment solutions to short-term strategies. The fifth hypothesis predicted that side effect would have a large impact on ED treatment decisions. Finally, it was hypothesized that intra-urethral suppository and oral medications would be identified as being used incorrectly on a consistent basis, as VCD and injection therapy involve in-office training sessions by office staff or sales professionals.

REVIEW OF LITERATURE

This review of literature is restricted to clinical data related to the questions addressed in this survey. Specifically, this review supports the use of second line treatments as primary options in certain instances. This information is presented in order to make comparisons between clinical findings and the findings of this survey of urologists.

The concept of urologists recommending specific treatment options for specific forms of ED was presented in the previous section, along with the idea that certain second line treatments are more appropriate as primary choices in certain circumstances. The first instance where this concept applies is following treatment of prostate cancer. This specific form of erectile dysfunction presents a different set of challenges to urologists, and in over the last decade a large amount of clinical research has focused on erectile dysfunction following prostate cancer treatment. While alternative treatment strategies for prostate cancer are readily available, including radiation therapy, cryoabalation, and laser removal techniques, the majority of postoperative data in the area of erectile function is limited to nerve-sparing and non nerve-sparing radical prostatectomy procedures.

According to several sources, the number of prostate cancer cases has increased in the last decade, which corresponds with the dramatic improvements in prostate cancer screening techniques. This increase has also been associated with a decrease in the average age of diagnosis, which has led to an increase in the demand for optimal postoperative quality of life, especially in the area of erectile function.[6,7]

In the treatment of clinically localized prostate cancer, radical prostatectomy is considered the "gold standard", and is often recommended as the primary therapy for patents with a life expectancy of at least 10 years.[8] While the intricacies of prostate surgery will not be

discussed at length, it is important to note that surgical excision of the prostate can take several forms, including bilateral nerve sparing, unilateral nerve sparing, and non-nerve sparing radical procedures. Both bilateral and unilateral procedures are often referred to as a nerve sparing radical retropubic prostatectomy, or NSRRP, while a non-nerve sparing procedure is referred to as a NNSRRP, or NNSRP. These procedures differ in their attention to preserving the integrity of the structures associated with both urinary continence and erectile function, and, to some extent, the type of radical prostatectomy performed depends on the characteristics of each individual case of prostate carcinoma. Despite this improvement in surgical technique, various sources site a range of patients experiencing erectile dysfunction, either 29% to 88%,[9] or 40% to 85% of patients postoperatively.[10] While many of these patients never return to full potency it is important to note that bilateral NSRRP is superior to unilateral NSRRP, and both nerve sparing procedures are superior to non-nerve sparing techniques.[11]

Numerous studies have focused on why erectile function is not restored in some patients, as well as what can be done postoperatively to improve the chances that a patient will again have natural erections. According to Dr. Edward Kim, even following successful NSRRP where both neurovascular bundles innervating the cavernous smooth muscle are spared, the cavernous nerves experience some degree of postoperative neuropraxia, or nerve shock.[12] While certain intricacies of prostate surgery may reduce the duration of this period of nerve shock, it is widely accepted that radical prostatectomy will likely cause the loss of natural erections, including the three to five nocturnal erections most men experience per night,[13] for a period of nine to twenty-four months following radical prostatectomy.[14]

Dr. Kim also asserts that, although neuropraxia may be temporary, this period of nerve shock is responsible for a decrease in the expression of nitric oxide synthase, as well as an

increase in the expression of transforming growth factor beta.[15] Nitric oxide is the primary vasodilator regulating male erections, and after nitric oxide is released from intracorporeal cavernous nerve terminals and blood vessel endothelium it diffuses into smooth muscle cells and activates the cyclic GMP second messenger system. This second messenger system is then ultimately responsible for the events leading to the final reduction of intracellular calcium responsible for smooth muscle relaxation and the engorgement of the penis with blood.[16] Decreased synthesis of nitric oxide is then directly linked with a reduction or complete loss of natural erections postoperatively. This loss of erectile function is also associated with poor oxygenation of the corpus cavernosa, which may facilitate an increase in expression of transforming growth factor- β (TGF-β) leading to the development of corporeal fibrosis.[17]

While some argue that hypoxic or low oxygen conditions are not necessarily present in the corpus cavernosa during extended periods without erections,[18] other researchers believe that oxygenation of the corpora is vital to maintaining a functional ratio of trabecular smooth muscle to connective tissue. This controversial topic is addressed by Dr. Ajay Nehra and colleagues in their review of the role of oxygen tension in erectile dysfunction. According to this review, patients with less than 37% trabecular smooth muscle were more likely to have diffuse venous leakage, a condition indicative of the most complete form of erectile dysfunction. According to this review, no amount of smooth muscle relaxation would allow successful veno-occlusion in these patients.

In addition to a decrease in the amount of trabecular smooth muscle, periods of low oxygen tension associated with neuropraxia may lead to the increased expression of TGF-β, which can induce a 2.5 to 4 fold increase in collagen production, as measured in cultured human cavernous cells. This build up of collagen associated is then associated with a loss of smooth

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muscle, a process often referred to as fibrosis.[19] The build up of fibrotic or scar tissue in the corpus cavernosa is yet another area of disagreement among researchers. According to Dr. Kim, the increased expression of TGF-β will eventually lead to fibrotic changes in the cavernous smooth muscle. Ciancio and Kim reported that 45 of 110 men evaluated following radical prostatectomy displayed the fibrotic changes described above. This study also reported that these patients reported penile shrinkage as well as veno-occlusive dysfunction that was resistant to intracavernous injection therapy and sildenifil (Viagra).[20]

The concept of penile shrinkage following radical prostatectomy is yet another condition associated with erectile dysfunction following radical prostatectomy. According to Fraiman, McCullough, and colleagues, flaccid and erect measurements of penile length and circumference decreased 8% and 9% respectively (P>0.05) in a postoperative NSRRP population of 100 men. The most dramatic of these changes were documented during a four to eight month period following surgery.[21] Munding, Wessells, and Dalkin also reported that 22 of 31 men (71%) experienced a decrease in stretched penile length of at least 0.5cm at three months postoperatively.[22]

While neither of these clinical studies identified a particular mechanism to explain the decrease in penile size, each suggested that trabecular smooth muscle apoptosis may have contributed to the shortening observed. It is important to note that some urologists maintain that penile shortening is the direct result of the removal of the prostatic urethra (the length of the urethra passing through the prostate). Both studies ruled out this hypothesis, stating there was no significant correlation between prostate size and amount of shortening and that changes in circumference were consistent with changes in length. While apoptosis, or programmed cell death, related to hypoxic conditions is a controversial topic, further research is needed to

properly identify it as the mechanism responsible for penile shortening following radical prostatectomy.

In summary, several interrelated mechanisms are thought to contribute to erectile dysfunction following radical prostatectomy. These mechanisms include neuropraxia, a decrease in nitric oxide synthase, low oxygen tension or hypoxia, loss of a functional smooth muscle to connective tissue ratio, and trabecular smooth muscle apoptosis. All of these mechanisms are thought to contribute to the overall failure of engorgement and/or veno-occlusion, making it difficult or impossible to create and sustain natural erections.

Recommendations were made in several of the sources cited above regarding postoperative treatment protocols that would likely increase the chances of patients returning to potency. As oral medications are largely ineffective during the nine to twelve month period of neuropraxia following NSRRP, some urologists recommend the use of second line treatments immediately following surgery. Dr. Kim, for example, recommends that post-NSRRP patients begin a rehabilitation protocol through a pharmacologic agent and a vacuum constriction device (VCD). He maintains that this method satisfies the initial eagerness of patients to try sildenafil (Viagra), while still providing a more successful treatment option to address frustrations the failure of oral medications in the first nine to twelve months following surgery.[23]

According to Craig Zippe and colleagues, the advantage to the use of a VCD in this type of treatment protocol is the increase in oxygenated blood flow provided by creating daily erections via negative vacuum pressure. In a study conducted at the Cleveland Clinic, daily use of a VCD alone during the first nine months following radical prostatectomy resulted in 55% of patients returning to natural erectile function, compared with 24% natural potency in a control group with no postoperative treatment regimen.

In another clinical study, post-NSRRP patients followed a regimen of three injections of alprostadil per week for twelve weeks. Following this protocol, a total of eight patients (67%) reported the return of natural erections, compared with three patients (20%) in a control group.[24] It is important to note that these results are not statistically significant, as patient cohorts are extremely small.

In conclusion, the authors of the clinical studies referred to above indicated the need for more research into the efficacy of postoperative rehabilitative efforts. They consented that their research was not extensive enough to show a direct correlation between rehabilitation attempts and return to potency. It is also important to note that other clinical studies have examined the efficacy of PDE-5 inhibitors in helping post-NSRRP patients return to potency. While not presented, this literature is also relevant to the treatment of erectile dysfunction following radical prostatectomy.

RESEARCH DESIGN AND METHODOLOGY

3.1 Purpose of the Study

This study sought to gain a better understanding of how urologists make decisions regarding the treatment of erectile dysfunction. The survey presented a series of questions to participants addressing this decision making process, as well as several items addressing specific areas of ED treatment and patient behavior. Another purpose of this survey was to obtain the results and experience necessary to conduct a larger, more in-depth survey focused on erectile dysfunction following radical prostatectomy.

3.2 Research Questions

Specifically, this study sought to answer the following questions:

1. Are certain treatment options for ED more readily available to patients than others?

2. How do urologists rank ED treatments based on being used correctly by patients on a consistent basis?

3. What factors influence a patient to seek treatment of erectile dysfunction?

4. How does the potential for side effects impact decisions made regarding the treatment of erectile dysfunction?

5. How does the underlying cause of a patient's condition relate to the efficacy of particular treatment strategies, and are their correlations between specific causes of ED and particular treatment options?

6. Do urologists use a set protocol to move from first to second line treatment options during the treatment of erectile dysfunction?

7. Are patients more interested in life-long or short-term solutions to erectile dysfunction?

8. How do urologists acquire clinical data published in recent clinical studies?

9. How does the information obtained from these clinical studies influence patient care?

3.3 Instrumentation

This study was restricted to one source of data, involving a paper and pencil survey that was distributed to 435 urologists across the nation. A total of 78 (18%) completed and returned the survey. Survey items required responses to one check list, one multiple choice question, two force-choice rank questions, and two questions with seven-point Likert scales. One item also required choosing first and second treatment options for ten conditions associated with ED. As this was the most complicated and most intriguing question of the survey, each questionnaire was folded in such a way that this question would be the first thing the participant would see upon opening the envelope.

3.4 Sample Population

The 78 (18%) respondents to the survey represented a variety of urology practices, including urology departments of major hospitals, universities, and veterans hospitals, as well as group and individual private practices. These participants were selected from *The Official ABMS Directory of Certified Medical Specialists, 2003*, as well as sources acquired by the thesis advisor, Dr. Steven Corbin. Demographic information of respondents was not solicited in order to maintain the integrity of the research.

3.5 Design of the Instrument

An initial draft of the paper and pencil survey was developed by the researcher and revised by thesis advisor Dr. Steven Corbin, and by Dr. Matthew Bunker, both professors of marketing at the University of Northern Iowa. This draft was piloted with two urologists from group private practices in order to create a final draft of the survey.

The first survey item required participants to indicate which ED treatment options were available at their practice. The list provided included hormone therapy, intra-urethral suppository, oral medication, penile injections, penile prosthesis, vacuum erection device, and a section for other available treatments.

The second and third survey items were force-choice rank questions. The second item asked participants to rank the same list of treatments provided in item one based on which are used correctly by patients on a consistent basis. A space was also provided for participants to add other treatment options not listed. Item three asked participants to force-choice rank a series of factors based on how often patients cite each as a reason for seeing a urologist. The list of influences provided included: referral from another healthcare provider, educational class, men's support group, suggestion by partner, advertisements, word of mouth, and a space was also provided for participants to add other influences not listed.

Survey item four required a response on a seven-point Likert scale to the following question: In regard to ED treatment, how does the potential for side effects impact decisions made by your patients? The Likert scale was arranged to have one represent that side effects had no impact on patient decisions, four represent that they had some impact, and seven represented that side effects had a large impact on patient decisions.

Item five asked participants to choose first and second treatment options for ten conditions associated with ED. The treatment options listed as choices included hormone therapy, intra-urethral suppository, oral medication, penile injections, penile prosthesis, vacuum erection device, and a section for other treatments not listed. The root causes, or conditions associated with ED provided included hormonal [low testosterone or high prolactin], neurogenic [stroke, pelvic injury, etc.] psychological, vascular [hypertension, peripheral disease], medicinal side effects, smoking-induced, diabetes, obesity, radical prostatectomy or NSRRP, and Peyronie's disease.

Item six asked participants to choose whether patients were evaluated using a set protocol or stepwise process, on a case-be-case basis, or a combination of the two strategies. Item seven used a seven-point Likert scale to quantify whether patients prefer a life-long solution to ED, a short-term solution to ED, or no preference. Item eight presented two free response questions. The first of these was, How do urologists acquire clinical data published in recent clinical studies? The second asked, How does the information obtained from these clinical studies influence patient care?

3.6 Administration of the Survey

Each urologist was sent a cover letter (see Appendix B), survey (see Appendix A), and a postage-free return envelope. The cover letter included relevant information regarding consent to human subjects review. Participants were instructed to return the survey in the postage-free return envelope upon completion. University of Northern Iowa letterhead and envelopes were used to improve the response rate for the survey.

3.7 Treatment of the Data

Analysis of data from completed surveys was conducted using the SPSS marketing research program. Descriptive analyses were conducted for each survey item, including frequencies, means, T-tests, and chi-square tests. The findings of these analyses will guide the discussion in the following sections.

PRESENTATION AND ANALYSIS OF THE DATA

4.1 Data Collection

A nine item questionnaire was sent to a random sample of urologists across the country. The responses of the 78 participants are presented in this section. It is important to note that the number of participants for each research question vary, as some participants failed to respond correctly to certain questions. Each question is examined individually, and the implications of these findings will be examined in the following section.

4.2 Research Question 1

Are certain treatment options for ED more readily available than others?

Availability of both first and second line treatment options in urology practices were determined by providing a checklist to participants and requesting that they indicate which treatment strategies are available at their practice. A space was also provided for any other treatments offered that were not listed in the checklist. Responses were then grouped for each treatment option based on whether that option was available or not. Table 3 presents the frequency of each response for the six treatment options provided. A chi square test was also conducted. The results of this analysis are not provided, as the availability of treatment options were not statistically different.

As indicated in Table 3, all 78 participants (100%) responded to item one. There was no statistically significant difference in the availability of the treatment options provided in the checklist. Oral medications, penile injections, and penile prosthesis were available at all 78 participating practices (100%). Vacuum erection devices were available at 77 practices (99%),

hormone therapy was available at 71 practices (91%), and intra-urethral suppository was available at 65 practices (83%). Counseling, psychotherapy, and sexual therapy were all provided by individual participants in the space marked other. These three suggested treatments could be used interchangeably, and one of these should be added to any future list of treatment options.

Table 3: Availability of treatment options in practices of participating urologists (N = 78)

	Hormone Therapy	Intra-urethral suppository	Oral Medication	Penile Injections	Penile Prosthesis	Vacuum Erection Device
Treatment Available	71	65	78	78	78	77
Treatment Unavailable	7	13	0	0	0	1
Percentage of practices where treatment is available	91%	83.3%	100%	100%	100%	98.7%

4.3 Research Question 2

How do urologists rank treatments of erectile dysfunction based on being used correctly by patients on a consistent basis?

To answer this question, participants were asked to force-choice rank a list of the same treatment options presented in item one. It is important to note that only 20 (26%) participants responded to this question correctly. An average rank order was determined using both the mean and median values for all six treatment options. This order is reflected in Table 4, which lists the treatment option used correctly most often first, and the treatment used correctly least often last.

Table 4: Rank order of treatments based on being used correctly on a consistent basis

Rank	Treatment Strategy	Mean rank	Median rank
1	Oral medication	1.86	2.00
2	Penile prosthesis	2.77	2.50
3	Hormone therapy	3.50	3.00
4	Penile injections	3.77	4.00
5	Vacuum erection device	4.00	4.00
6	Intra-urethral suppository	4.80	5.00

4.4 Research Question 3

What factors influence a patient to seek treatment of erectile dysfunction?

To answer this question, participants were asked to force-choice rank a list of influences based on how often patients cited each as a reason for seeing a urologist. The mean and median for each influence are presented in Table 6, and the frequency of each of the six rankings is presented in Table 7. An average rank order was determined using both the mean and median values for all six reasons for seeking treatment. This order is reflected in Table 4, which lists reasons in the average rank order.

It is important to note that the number of participants that responded to this question correctly vary for each of the influences provided. This discrepancy is based on the fact that some participants did not assign a rank to each influence. Instead they chose to only rank the few influences that applied to their practice. The number of respondents for each of the influences is indicated in Table 6. As in item two, a space was provided for participants to list other influences not listed as choices. One of these suggestions appeared twice and might be included as an option in future surveys.

Table 5: Rank order of factors influencing patients to seek treatment for ED

Rank	Treatment Strategy	Mean rank	Median rank
1	Referral from another healthcare provider	1.32	1.00
2	Word of mouth	2.53	2.00
3	Suggestion by partner	3.07	3.00
4	Advertisements	3.50	3.00
5	Men's support group	5.12	5.00
6	Educational class	5.21	5.00

4.5 Research Question 4

How does the potential for side effects impact decisions made regarding the treatment of erectile dysfunction?

To answer this question, each participant was asked to choose a number on a seven-point Likert scale to quantify the impact of side effects on the treatment decisions made by patients. Analysis of survey results were conducted using two different T-tests. The first was designed to determine whether side effects had no impact on patient decisions. This test determined that the mean response was significantly higher than one, indicating that side effects do have some impact on patient decisions. The second T-test was designed to determine whether the impact of side effects was statistically higher than four ($P > 0.001$), which would correspond to the midpoint of the Likert scale. This midpoint was labeled "Some Impact" on the survey, and this second test confirmed that the physicians surveyed believed that side effects had more than "some impact" on patient decisions. Figure 1 and Figure 2 present the distribution of the Likert scale for survey item four, emphasizing that the mean response was distributed above the midpoint of the scale, which was also reflected in the mean Likert scale value of 4.70.

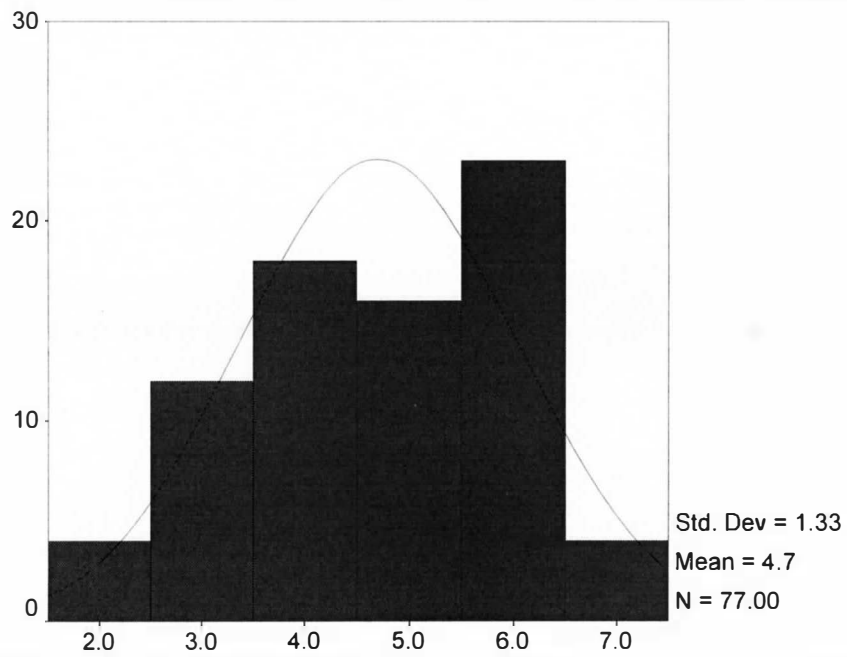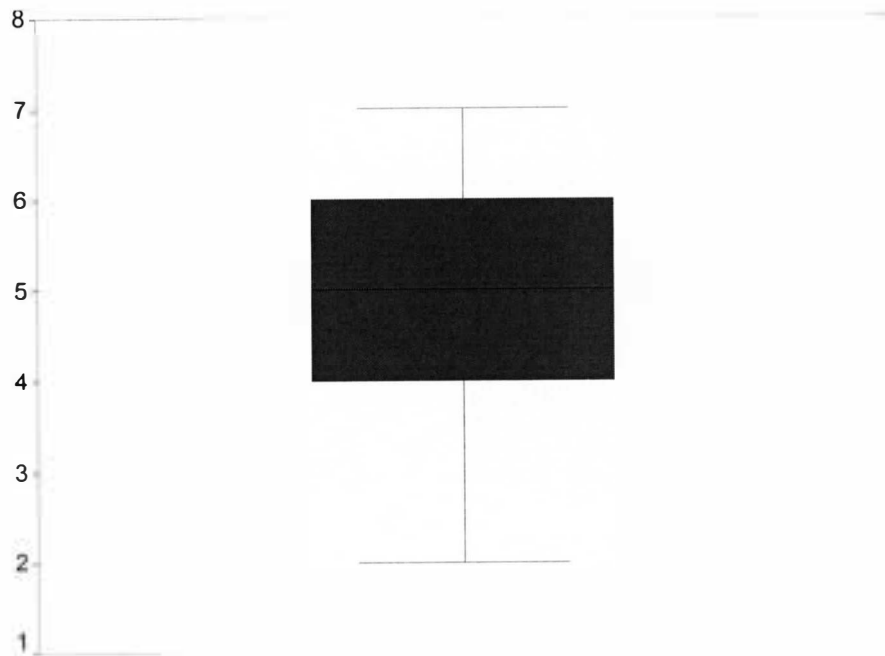**Figure 1: Distribution of Likert scale values for impact of side effects on patient decisions**

Std. Dev = 1.33
Mean = 4.7
N = 77.00

**Figure 2: Distribution of Likert scale values above and below midpoint
for impact of side effects on patient decisions**

4.6 Research Question 5

How does the underlying cause of a patient's condition relate to the efficacy of particular treatment strategies, and are their correlations between specific causes of ED and particular treatment options?

To answer this question, participants were provided with a list of ten conditions associated with ED and asked to list the first and second most appropriate treatment option for each condition from the list of treatments provided. While this survey item was significantly more complicated than any other question, the response rate was still high with between 69 (88%) and 75 (96%) of the 78 participants responding correctly.

The findings of item five are presented in two parts, with Table 6 representing the observed frequencies for the first choice treatment for each condition, and Table 7 representing the observed frequencies for second choice treatments. The frequencies that are significantly greater than the expected values are indicated according to the table legends provided. The frequencies for hormonal causes, such as low testosterone or low prolactin, were not included in Table 6, as hormone therapy was the only treatment significantly higher ($P > 0.01$) than the expected value as a first choice treatment. Similarly, the frequencies for obesity associated with ED are not included in Table 6, as oral medication was the only treatment significantly higher ($P > 0.01$) than the expected value as a first choice treatment.

As indicated in Table 6, oral medications were the only first choice treatment with significantly higher frequencies than the expected values, and this trend was observed with every condition except hormonal ED. While no other frequencies were significantly higher than expected, two situations are worth noting.

First, the frequency of injection therapy as a first choice treatment in ED patients following radical prostatectomy or NSRRP (n = 20) was noticeably higher than the expected value (n = 12.5). Furthermore, NSRRP was the only condition where traditionally second line alternatives (intra-urethral suppository, VED, and injection therapy) were collectively (n = 27) significantly higher (P > 0.05) than the expected value (n = 12.5). The implications of this finding will be discussed further in the following section. Second, the frequency of implantation of a penile prosthesis as a first choice treatment for ED patients with symptoms of Peyronie's disease (n = 11) were also higher than the expected value (n = 9.7). This finding is interesting in that penile implants are widely considered a final line of treatment, or last resort. This finding will also be discussed further in the following section.

As indicated in Table 7, injection therapy was the most widely preferred second option for treatment of ED, except in the cases of hormonal ED, where oral medications were indicated as the best second line option, and Peyronie's disease, where penile prosthesis was the most appropriate second option. Vacuum erection devices were also preferred more often than expected across the board, with statistically significantly higher frequencies (P > 0.10) for neurogenic, psychological, smoking-induced, and medicinal ED. The correlation of penile prosthesis implantation with Peyronie's disease was also continued, as 45% of participants chose prosthesis as the most appropriate second option. This finding was also statistically significant (P > 0.05).

As with items two and three, a space was provided to insert treatment options not listed as options. One treatment option appeared eleven times in various wordings in this space, and in future studies it should be included as counseling or psychological consult. When written in the space marked other, this option was consistently listed as a primary or secondary treatment for

psychological impotency. Also, several participants listed quitting smoking as a first or second choice treatment option for smoking-induced ED.

Table 6: First choice treatment preferences for 10 conditions provided in item five

	Peyronie's Disease	Neurogenic [stroke, etc.]	Psychological Impotence	Vascular [hypertension, peripheral dis.]	Smoking Induced	Diabetes	NSRRP	Medicinal Side Effects
Oral Medication	41**	57**	59**	63**	69**	67**	45**	53**
Injection Therapy	4	8	0	5	1	4	20	7
Vacuum Erection Device	9	2	1	3	1	1	6	4
Intra-urethral suppository	0	4	0	0	0	0	1	0
Penile Prosthesis	11	1	0	2	0	2	1	0
Hormone Therapy	1	0	0	0	0	0	1	0
OTHER	1	0	12	0	1	0	0	5
TOTAL	N = 71	N = 72	N = 72	N = 73	N = 69	N = 74	N = 75	N = 69

Legend: Table 6 & Table 7
** = Statistically significant
(P = 0.05)
* = Statistically significant
(P = 0.10)

Table 7: Second Choice Treatment Preferences for 10 conditions provided in item 5

	Hormone Therapy	Peyronie's Disease	Neurogenic [stroke, etc.]	Psychological Impotence	Vascular [hypertension, peripheral dis.]	Smoking Induced	Diabetes	Obesity	NSRRP	Medicinal Side Effects
Oral Medication	50**	8	2	11	4	2	1	3	8	8
Injection Therapy	3	14	32**	21*	36**	33**	37**	30**	30**	25**
Vacuum Erection Device	2	9	20*	17*	19	21*	19	18	19	21*
Intra-urethral suppository	0	3	7	6	4	9	6	8	3	8
Penile Prosthesis	1	29**	8	1	8	2	7	5	14	6
Hormone Therapy	5	1	0	0	1	1	2	3	1	1
OTHER	3	1	0	7	0	1	0	1	0	1
TOTAL	N = 65	N = 65	N = 70	N = 63	N = 72	N = 69	N = 74	N = 68	N = 75	N = 70

4.7 Research Question 6

Do urologists use a set protocol to move from first to second line treatment options during the treatment of erectile dysfunction?

To answer this question, participants asked to choose one of three options provided that best represents how patients are evaluated in regards to ED treatment. The three choices were cases-by case treatment, a protocol or stepwise process, or a combination of the two strategies. A chi square test was conducted to test for significant differences between these three choices. Participants clearly indicated that patients were evaluated on a case-by-case basis or a combination of case-by-case evaluation and referring to a set protocol. While these results seem clear, a more specific question might be asked in future surveys to determine whether a protocol is ever set to move ED patients from first to second line treatment strategies.

4.8 Research Question 7

Are patients more interested in life-long or short-term solutions to erectile dysfunction?

To answer this question, each participant was asked to choose a number on a seven-point Likert scale to quantify the amount of interest patients express in the duration of ED treatments. The results of this question were analyzed using a chi square test, which was determined that no individual number was significantly more frequent than expected. However, the distribution of responses was tri-modal, showing relatively higher frequencies at two, four, and six, which represent moderately life-long solution, no preference, and moderately short-term solution respectively. After separating the seven-point scale into groups, with one to three representing life-long solutions, four representing no preference, and five through seven representing short-term solutions, a second chi square test was conducted. This test determined that patients generally preferred a relatively short-term solution to ED, as the five to seven grouping was statistically significantly higher than the four or one through three groupings ($P > 0.10$).

4.9 Free response questions

How do urologists acquire clinical data published in recent clinical studies, and how does the information obtained from these clinical studies influence patient care? Participants were asked to respond to both of these questions directly. Responses were then cataloged in order to observe general trends.

The first of the three most frequent responses to the first question were journals, including peer-reviewed journals, such as the *Journal of Urology,* as well as e-journals such as Urology Times and other internet services. The second most frequent response was that urologists obtained clinical study information from conferences, such as the American Urology Association annual conference. The third most frequent response involved medical and pharmaceutical sales representatives providing physicians with information. The references to this trend varied. Some respondents referred to the process as detailing, which is an industry term for sales representatives attempting to persuade physicians to prescribe their product during the few seconds that the doctors have between patients. Others respondents stated that sales representatives were another source for obtaining clinical studies. One respondent even commented that drug representatives were unreliable. The reliability of sales professionals as sources for information might then be a topic for future research.

The second free response question yielded a large variety of responses. Some respondents simply stated that clinical studies had little impact on patient care, while others indicated that new findings published in peer-reviewed journals were incorporated into their practice. Still others indicated that a consensus of some type was needed to make any changes in status quo.

While these brief responses provide some insight, future surveys should likely avoid posing free response questions to urologists. In short, responses are too brief and too few to yield any positive results. Instead, one-on-one interviews might be conducted to obtain more specific information or useable quotations.

SUMMARY OF RESULTS

In summary, the results of survey item one indicated that of the six standard treatment options for erectile dysfunction, intra-urethral suppository was the least readily available, followed by hormone therapy. While these findings were not statistically significant, it supports a general trend moving away from these two treatments. However, further research is needed to substantiate this trend.

The results of survey item two provided a rank order of standard treatment options based on how often patients used them correctly. The following rank order is listed from used most consistently correct to least consistently correct: Oral medication, penile prosthesis, hormone therapy, injection therapy, vacuum erection device, and intra-urethral suppository. This order was not completely consistent with the predicted results, as oral medications were predicted to be used incorrectly on a consistent basis.

The results of survey item three provided a rank order of factors influencing patients seeing a urologist for treatment of ED. The following rank order is listed from most influential to least influential factor: Referral from another healthcare provider, word of mouth, suggestion by partner, advertisements, men's support group, and educational class. This order did not confirm the original hypothesis, as advertisements were less of an influence than expected. However, this order is consistent with marketing research of many other products, as word of mouth communication is an extremely powerful force in the marketplace.

The results of survey item four indicated the perceived impact by urologists of the potential for side effects on patient decisions regarding ED treatment. Urologists quantified this impact as significantly higher (P >0.001) than the midpoint of the Likert scale, which represented "some impact." The mean Likert scale value of 4.70 also reflected this finding. This value was

lower than originally predicted, but consistent with the idea that side effects do impact patient decisions.

The results of survey item five confirmed the original hypothesis that their were correlations between certain treatment options and specific conditions associated with ED. It was also confirmed that vacuum constriction devices and intracavernous injections are viable first line treatment options for patients following radical prostatectomy or NSRRP. Furthermore, the review of literature section provided support for variation in the efficacy of certain treatment options in response to certain underlying causes of ED.

The results of survey item six indicated that urologists prefer to diagnose and treat ED on a case-by-case basis or a combination of a case-by-case and protocol or stepwise approach. Participants clearly indicated that a set protocol could not be followed in diagnosing and treating ED patients. This was in direct conflict with the original hypothesis.

Survey item seven provided evidence that patients to some extent prefer short-term solutions instead of long-term solutions to erectile dysfunction. Specifically, a tri-modal distribution of Likert scale values provided by participating urologists indicated a slight *preference for short-term treatment strategies in ED patients. Again, this finding was in direct* conflict with pre-study predictions.

Finally, the free response questions confirmed that urologists do in fact rely on journals, conferences, and sales professionals to provide recent clinical study data as a means of continuing education. However, the extent to which this data effects patient care was unclear in the responses gathered. More evidence must be gathered to support the trends observed in these free response questions.

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This section presents the conclusions derived from the findings presented in the previous section and provides recommendations for future research. The implications and limitations of survey items are discussed individually, and improvements are suggested for future research. As mentioned earlier, one objective of this survey was to gather the results and experience needed to conduct a second survey with a more narrow focus. This section will outline possible objectives and research questions to be included in this survey.

The results of survey item one provided evidence that each of the six treatments provided as choices were readily available at urology offices across the nation. While there was no statistical difference in availability, results indicated that intra-urethral suppository, or Muse, and hormonal therapy were available in 83% and 91% of practices respectively, compared with over 98% for the other treatment options provided as choices. This finding may reflect urologists moving away from the prescription of Muse, but more research would be necessary to substantiate this trend. While hormonal treatment was also less readily available, this difference might be due to the fact that hormonal imbalances are often treated by endocrinologists. In some urology practices it might be a standard procedure to refer patients with hormonal causes of ED to an endocrinologist, especially in a university or hospital setting where one may be located in the same building. In short, the findings of this survey item were very limited, and determining the availability of treatment options should not be an objective in future research.

The results of survey item two provided a rank order of treatment strategies based on how often each is used correctly. Specifically, oral medications were chosen as being used most correctly on a consistent basis. These findings directly contradicted the research hypotheses,

which predicted that oral medications and intra-urethral suppository would be used incorrectly because little training was provided for patients. However, this finding was not surprising, as instructions on the labels stipulate when to take medication in relation to meals. The surprising finding of this item was that injection therapy and vacuum erection devices were ranked fourth and fifth respectively, despite the in-depth training of patients in the use of these products in the office setting. One explanation for this would be that not all offices place an emphasis on patient education or training in the use of these products. These results provide evidence that it is extremely important for physicians, nurses, and sales professionals to spend time training patients on the use of these products.

It is also important to note that only 20 (26%) participants responded to this question correctly. This large number of unusable responses was largely due to many respondents using a Likert scale numbering system to assign a value for each treatment instead of ranking the strategies one through six. This miscommunication might have resulted from the specific design of the question, as a dashed line was placed between one and six directly above the question. This may have led respondents to assume that they were to respond along that continuum instead of ranking the treatments. In future surveys it should be made abundantly clear that participants are to rank options from one through six, and a dashed line should not be used as it may imply a continuum or Likert scale type question. Another explanation for these unusable responses might be that urologists have encountered this question in a continuum form many times already. In this case, many participants may have responded to the question as they did in previous surveys without noticing the request to rank the treatments.

These results indicate that urologists believe that patients are less likely to make mistakes in the use of oral treatments, as with PDE-5 inhibitors, and with implanted devices such as penile

prosthesis. In short, any treatment that involves the application of an external treatment of injections into the penis has an increased opportunity for error. Future research should then focus on how the potential for patient misuse of treatment options effects how urologists recommend treatments for ED.

The results of survey item three provided a rank order of factors influencing patients to seek treatment for ED. This rank order did not correspond to the research hypothesis, as referral from another healthcare provider, word of mouth, and suggestion from partner were indicated as the top three influences of patient decisions regarding ED treatment. While advertisements of oral medications are very visible in the media, it is interesting to note that referrals and word of mouth are still the most powerful motivators. This finding is consistent with marketing research of many other products, and emphasizes the fact that discussions of erectile dysfunction are becoming more commonplace.

It was also interesting to note that the response rate for item three was greater than item two, providing further evidence that the dashed line included in item two may have confused participants. Future research should focus on further probing why patients seek treatment for ED, possibly through a survey of patients at urology clinics.

The results of survey item four provided evidence that the potential for side effects does impact patient decisions regarding ED treatment. However, these results were unclear as to the extent of this influence, as the mean score on the seven-point Likert scale was only slightly above the midpoint, which was designated "Some effect." These results were not consistent with the research hypothesis, as it was predicted that side effects would have a larger impact.

Future research questions should be more specific in the examination of side effects. For example, one question might focus on the invasiveness of the treatment and how that affects the

severity of side effects. Another question might attempt to determine which side effects are most detrimental and which are considered acceptable.

Survey item five was consistent with survey hypotheses in that certain treatments were preferred for certain root causes of ED, and that injection therapy and vacuum erection devices were indicated as viable options for first line treatment of post radical prostatectomy patients. However, oral medications were still indicated as the preferred first line treatment, with injection therapy and VED being preferred as second line treatments. This was not consistent with the clinical data presented in the review of literature. Furthermore, the data collected from this survey item indicated that oral medications are still the first line treatment and other strategies are indeed second line options.

The discrepancy between the review of literature and the findings of this survey is most likely the result of many factors. First, as mentioned in the free response questions reviewed later in this section, many urologists wait to make changes in patient care until a general consensus as been reached regarding new clinical data. A consensus has apparently not been reached in regards to this issue, as one of the articles referenced in the review section had an editor's note contradicting the findings presented in the article. It is also possible that the ease of use associated with oral medications make it a first line treatment regardless of the root cause of erectile dysfunction. This possibility should be explored in future research.

Another explanation for this discrepancy is that the evidence for the use of oral medications may outweigh the evidence for the use of injection or vacuum therapy following NSRRP. However, it is also possible that patients may only be interested in first line treatment following NSRRP and may never express interest in second line treatments.

The results of survey item six were very clear in that participating urologists were not in favor of using a set protocol or stepwise process in evaluating patients with ED. The vast majority of participants indicated that treatment of ED patients followed either a combination of protocol and case-by-case method or was conducted strictly on a case by case basis. The implications of this finding are that urologists believe that each individual patient is different, and as such may have different needs or expectations regarding treatment of ED. It is also important to note that this finding is consistent with the concept that patients have an integral part in determining which treatment option to use.

Future research in this area should focus on the extent to which patients influence the treatment option their urologist prescribes. Future research might also explore whether urologists use a protocol or stepwise process in prescribing treatments following the failure of a previous treatment. Specifically, how do urologists deal with patients that are dissatisfied with their first, second, or even third treatment strategy? When asking these questions it is important to give a better definition of what constitutes a protocol or stepwise process. A more substantial pilot study should also be used in order to test for the validity of survey questions.

Item seven provided evidence that urologists felt patients preferred a short-term solution compared to a long-term solution. More specifically, participants indicated that patients were not concerned with long-term solutions. This finding is significant in that oral medications and penile injections are known to become ineffective after long periods of being used successfully, and vacuum erection devices are known as a life-long solution. While these findings indicate that patients may not have a long-term perspective in mind, future research might ask whether patients what specific length of time they expected treatment strategies to be effective for.

The free response questions provided evidence that physicians obtained clinical data from three sources: peer-reviewed and internet based journals, conferences, and sales representatives. Future research in the area of obtaining clinical studies and continuing education of urologists might focus on the role sales representatives as intermediaries. In short, these questions were not effective survey items in that they did not provide substantial results and did not allow for analysis. Future research should avoid using of free response questions and instead rely on personal or telephone interviews to substantiate results or gather quotes.

Overall, this survey provided useable results and allowed the researcher to form general conclusions. However, some survey items also proved to be flawed, and future research will take these issues into consideration. One of the most significant limitations of this study was the number of participants that answered questions incorrectly. This problem might be rectified by conducting a more thorough pilot study.

Another limitation was the ineffectiveness of the short answer questions. While most participants did respond, many only wrote a few words, some of which were completely illegible. This limitation is not surprising, as physicians are typically have very demanding schedules and may not have the time to provide lengthy responses.

It is also important to note that future research should provide a more focused topic in order to allow a series of short, easy to understand survey items that will collectively provide valid results. In a way, this survey was a pilot study to determine which of the seven survey items presented the best area for more in-depth future research. Items five, six, and seven are probably the most intriguing areas for future research.

In conclusion, this survey fulfilled the original objectives, especially in that it provided valuable research experience and acted as a type of pilot study for future research. Future work

will likely focus on the shortcomings of this survey, as well as probe further into the results

obtained. Future research may also examine more specific correlations between diabetic patients

suffering from ED and specific treatment options.

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APPENDIX A

Questionnaire

INTRODUCTION

The purpose of this survey is to understand how Urologists make decisions regarding the treatment of erectile dysfunction. Your response to this survey **confidential**; demographic information is NOT being solicited. This questionnaire should take no more than 4-5 minutes to complete. Your responses are very valuable to the completion of my Honors Research Thesis.
Thank you for your cooperation.

Please return completed survey to: Mark Thomsen   Please return by:
(self-addressed stamped envelope enclosed)   1115 West 23rd Street   February 15, 2005
                                      Cedar Falls, IA 50613

1. What treatment strategies are available at your practice for the 30 million men that experience erectile dysfunction each year?

Please check all that apply:

☑ Hormone Therapy   ☑ Penile Injections   ☑ Other: _Counseling (See 7b)_
☑ Intra-Urethral   ☑ Penile Prosthesis   (Please Specify)
☑ Suppository   ☑ Vacuum Erection
☑ Oral Medication   Device

2. Please force-choice rank the following treatment options for erectile dysfunction based on which are used correctly by patients on a consistent basis.

(1 = Used <u>correctly</u> on <u>a consistent</u> basis, ... , 6 = Used <u>incorrectly</u> on a consistent basis)

_4_ Hormone Therapy   _6_ Penile Injection   ___ Other:
_5_ Intra-Urethral   _3_ Penile Prosthesis
    Suppository   _1_ Vacuum Erection   (Please Specify)
_2_ Oral Medication   Device

3. Based on your experience, please force-choice the following situations based on how often your patients cite each as a reason for seeing a Urologist.

(1 = <u>most frequent</u> reason , ... , 6 = <u>least frequent</u> reason)

_1_ Referral from another health care provider   _4_ Advertisements
_6_ Educational class   _2_ Word of mouth
_5_ Men's support group   ___ Other: _____
_3_ Suggestion by partner   Please specify

4. In regard to ED treatment, please use the scale below to quantify how the potential for treatment side effects impacts decisions made by your patients.

Has no impact   Has some impact   Has a large impact
1   2   3   (4)   5   6   7

5. How does the underlying cause of a patient's condition relate to the efficacy of particular treatment strategies?

For each of the conditions listed below, please choose the **two most appropriate** treatment strategies from the list provided (left). Respond by listing the number of the
most appropriate treatment on the left and the **second most appropriate treatment on the right.**

1. Hormone Therapy
2. Intra-Urethral Suppository
3. Oral Medication
4. Penile Injection
5. Penile Prosthesis
6. Vacuum Erection Device
7. Other: _Counseling_
     (please specify)

_1_ Hormonal [low testosterone/high prolactin]   _6_
_4_ Neurogenic [stroke, pelvic injury, etc.]   _2_
_7_ Psychological Impotency   _6_
_3_ Vascular [hypertension, peripheral disease]   _6_
_3_ Medicinal side effects   _6_
_3_ Smoking-induced   _4_
_3_ Diabetes   _6_
_3_ Obesity   _6_
_4_ Radical Prostatectomy or NSRRP   _3_
_6_ Peyronie's Disease   _3_

6. Please choose one of the following options that best corresponds with the way patients are evaluated at your practice: Are treatment strategies chosen on a case-by-case basis, or is a protocol or step-wise process established and followed for most patients? Are both strategies used?

Case-by-case treatment   Both strategies are used   Protocoal/Step-wise Process
         1   2

7. Do your patients express interest in a life-long solution to their erectile dysfunction, or are they satisfied with short-term improvement?

Life-long solution sought   No preference   Short-term improvement sought
1   2   3   4   5   6   7

8. Please respond to these two questions:

A. How do physicians and surgeons in Urology typically acquire data published in recent clinical studies? _Journal of Urology, Urology, British J. of Urology, Confidential (American Urological Association), AUA, etc._

B. How does the information obtained from these clinical studies make a difference in how patients are treated? _Latest, up-to-date information that has been tested_

Thank you for returning your completed questionnaire in the enclosed postage-paid envelope by February 15, 2005. If you would like a copy of the survey results, please provide me your name and address, or you may request a copy via email.

Please refer questions or comments to: Mark Thomsen   Mobile: 402/740-7242
                                              1115 West 23rd Street   Email: MThomsn3@UNI.edu
                                              Cedar Falls, IA 50613

APPENDIX B

Cover Letter

February 4, 2005

It would be **greatly** appreciated if you could participate in a University of Northern Iowa Biology major's Senior Honors Program Research Thesis. The research focuses on *erectile dysfunction treatment strategies*.

The simple to complete 8-item survey is being sent to a random sample of Urologists. A pilot study completed by a sample of Urologists indicated that it should only take 4-5 minutes of your time to complete the questionnaire.

Please fill out the enclosed survey and return it in the *postage-paid* envelope that is already addressed to: Mark Thomsen, 115 West 23rd Street, Cedar Falls, IA 50613.

Your answers will remain underlined confidential and NO attempt will be made to determine the identity of individual questionnaires. Your participation is completely voluntary. You are free to choose not to participate at all, and by doing so, you will not be penalized or lose benefits to which you are otherwise entitled. We perceive that completing the survey will not cause any social, economic, psychological, or physical risk. The survey is being sent to a random sample of Urologists and NOT to a vulnerable population, including patients diagnosed with erectile dysfunction. Personal demographic inquiries are NOT being solicited to further protect the confidentiality of respondents.

If you have any questions regarding the survey, we may be contacted as noted below our respective names.

Thank you for your participation in the ED treatment strategy survey as it is invaluable to the completion of the Honors Program Research Thesis.

Sincerely,

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