Although urology started as a surgical specialty, medicines play an expanding role in the management of urological disease.

Medicines in urology may be discussed under the following drug class:

(a) Drugs used for overactive bladder, OAB: The oldest drug is Flavoxate, with rather non-specific and weak anti-cholinergic action. The anti-cholinergic of choice is currently Tolterodine, reflected in its increased usage. However, there are newer anti-cholinergics with less side effects of dry mouth. When the newer agents are duly registered, it is likely to increase in usage, as seen in other countries.

(b) Drugs used in erectile dysfunction: The oral prostaglandin type 5 inhibitors, namely Sildenafil, Tadalafil and Vardenafil are introduced at different stages in Malaysia. It is therefore not unexpected the earlier drug, namely, Sildenafil has a bigger usage. Experience in other countries showed that the 3 drugs have almost an equal share.

Alprostadil is actually an injectable although put in the same group. The usage is reported as very low. Nevertheless, this has more or less replaced Papaverine as the first line intracorporeal injection for penile erection. Alprostadil have a small but definite role in the treatment of erectile dysfunction.

(c) Alpha-adrenoreceptor antagonists: There are 3 main drugs in this group used for relief of bladder outlet obstruction. Only the extended release (XL) form of Alfuzosin is available. For Doxazosin, both the extended release (XL) as well as the rapid release lower dosage is available. For Terazosin, only the rapid release incremental dosages (1, 2, 5 mg) are available. It is likely that the drug usage reported refers to the optimal dosage and not the starting dosage of this alpha-adrenoreceptor antagonist.

(d) 5-alpha reductase inhibitors: There are currently 2 drugs in this class, namely, Finasteride and Dutasteride. Finasteride has been in use for more than 10 years and currently, the generic forms are available. Therefore, it is not surprising that usage of Finasteride is more than that of Dutasteride.

(e) Gonadotrophin releasing hormone analogues: In urology, these drugs are used to inhibit the production of testosterone by the testes, as a treatment for advanced prostate cancer. This includes Buserelin, Leuprolrelin, Goserelin and Triptorelin. Again, they are short acting as well as depot versions (with action ranging from 3 to 12 months). They are also used by the gynaecologists and the total usage probably covers both usages.

(f) Anti-estrogens: These include Flutamide, Bicalutamide and Cyproterone Acetate. For some patients with prostate cancer, anti-androgens are added onto the gonadotrophin release hormone analogues for maximal androgen blockage (MAB). This is to block the action of hormones from the adrenal glands.

(g) Selective immunosuppressive agents for metastatic kidney cancer: This new group of drugs includes Etanercept, Infliximab, Leflunomide, Efalizumab. These are new drugs which have shown some efficacy for metastatic renal cancer. They are often used by the urologists together with the medical oncologists. In view of the high cost, it is probable that the reported usage from the present survey is an underestimate as they are likely to be used in the private hospitals.

(h) Testosterone: Testosterone is increasing used in the field of men’s health. A recent survey showed that there is a 20% incidence of testosterone deficient syndrome in patients with metabolic syndrome. Again, these drugs are likely to be given by private specialists.
(i) Anti-diuretic hormone: The commercial preparation of this is Desmopressin (Minirin). It is used mainly to treat nocturnal polyuria which is seen in paediatric patients with enuresis and in some elderly men.

Table 13.1: Use of Urological, in DDD/1000 population/day 2006

<table>
<thead>
<tr>
<th>ATC</th>
<th>Drug Class and Agents</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>G04</td>
<td>UROLOGICALS</td>
<td>0.7232</td>
</tr>
</tbody>
</table>

Table 13.2.1: Use of Urological by Drug Class, in DDD/1000 population/day 2006

<table>
<thead>
<tr>
<th>ATC</th>
<th>Drug Class and Agents</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>G04B</td>
<td>OTHER UROLOGICALS, INCL. ANTISPASMODICS</td>
<td>0.2018</td>
</tr>
<tr>
<td>G04C</td>
<td>DRUGS USED IN BENIGN PROSTATIC HYPER TROPHY</td>
<td>0.5214</td>
</tr>
</tbody>
</table>

Table 13.2.2: Use of Gynecological, Sex Hormones and Hormonal Contraceptives by Drug Class and Agents, in DDD/1000 population/day 2006

<table>
<thead>
<tr>
<th>ATC</th>
<th>Drug Class and Agents</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>G04B D</td>
<td>Urinary antispasmodics</td>
<td></td>
</tr>
<tr>
<td>G04B D02</td>
<td>Flavoxate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0149</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.0151</td>
</tr>
<tr>
<td>G04B D04</td>
<td>Oxybutynin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.0029</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0003</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.0032</td>
</tr>
<tr>
<td>G04B D07</td>
<td>Tolterodine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.0159</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.0219</td>
</tr>
<tr>
<td>G04B E</td>
<td>Drugs used in erectile dysfunction</td>
<td></td>
</tr>
<tr>
<td>G04B E01</td>
<td>Alprostadil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>G04B E03</td>
<td>Sildenafil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.0011</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.1173</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.1184</td>
</tr>
<tr>
<td>G04B E08</td>
<td>Tadalafil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.0023</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0364</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.0387</td>
</tr>
<tr>
<td>G04B E09</td>
<td>Vardenafil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0044</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.0045</td>
</tr>
<tr>
<td>G04C A</td>
<td>Alpha-adrenoreceptor antagonists</td>
<td></td>
</tr>
<tr>
<td>G04C A01</td>
<td>Alfuzosin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.048</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0506</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.0986</td>
</tr>
<tr>
<td>G04C A03</td>
<td>Terazosin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.2885</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0706</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.359</td>
</tr>
<tr>
<td>C02CA04</td>
<td>Doxazosin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.1764</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0628</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.2393</td>
</tr>
</tbody>
</table>
### Table 13.2.3: Use of Urologicals listed in other chapters, Gonadotropin releasing hormone analogues, anti-androgens, selective immunosuppressive agents, hormones

<table>
<thead>
<tr>
<th>ATC</th>
<th>Drug Class and Agents</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>G04C B</td>
<td><strong>Testosterone-5-alpha reductase inhibitors</strong></td>
<td></td>
</tr>
<tr>
<td>G04C B01</td>
<td>Finasteride</td>
<td>Public 0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0039</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0339</td>
</tr>
<tr>
<td>G04C B02</td>
<td>Dutasteride</td>
<td>Public 0.0151</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0148</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0299</td>
</tr>
</tbody>
</table>

**Note**: Public, Private, Total 2006 values are given in parentheses.

<table>
<thead>
<tr>
<th>ATC</th>
<th>Drug Class and Agents</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>L02A E</td>
<td><strong>Gonadotropin releasing hormone analogues</strong></td>
<td></td>
</tr>
<tr>
<td>L02A E01</td>
<td>Buserelin</td>
<td>Public &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total &lt;0.0001</td>
</tr>
<tr>
<td>L02A E02</td>
<td>Leuprorelin</td>
<td>Public 0.0024</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0085</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0109</td>
</tr>
<tr>
<td>L02A E03</td>
<td>Goserelin</td>
<td>Public 0.0038</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0021</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0059</td>
</tr>
<tr>
<td>L02A E04</td>
<td>Triptorelin</td>
<td>Public 0.0011</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0015</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATC</th>
<th>Drug Class and Agents</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>L02B A</td>
<td><strong>Anti-oxoandrosten (4) derivatives</strong></td>
<td></td>
</tr>
<tr>
<td>L02B B01</td>
<td>Flutamide</td>
<td>Public 0.0018</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0025</td>
</tr>
<tr>
<td>L02B B03</td>
<td>Bicalutamide</td>
<td>Public 0.0053</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0063</td>
</tr>
<tr>
<td></td>
<td><strong>Cyproterone acetate</strong></td>
<td>Public 0.0111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0919</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.3277</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATC</th>
<th>Drug Class and Agents</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>L04A A</td>
<td><strong>Selective immunosuppressive agents</strong></td>
<td></td>
</tr>
<tr>
<td>L04A A11</td>
<td>Etanercept</td>
<td>Public &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.001</td>
</tr>
<tr>
<td>L04A A12</td>
<td>Infliximab</td>
<td>Public &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0036</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0037</td>
</tr>
<tr>
<td>L04A A13</td>
<td>Leflunomide</td>
<td>Public 0.0077</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private 0.0069</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 0.0146</td>
</tr>
<tr>
<td>L04A A21</td>
<td>Efalizumab</td>
<td>Public -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total &lt;0.0001</td>
</tr>
</tbody>
</table>
### CHAPTER 13
USE OF UROLOGICALS

#### Malaysian Statistics on Medicines 2006

<table>
<thead>
<tr>
<th>ATC</th>
<th>Drug Class and Agents</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>G03</td>
<td>Sex Hormones</td>
<td></td>
</tr>
<tr>
<td>G03B</td>
<td>3-oxoandrostene (4) derivatives</td>
<td></td>
</tr>
<tr>
<td>G03B</td>
<td>Testosterone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.0112</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0133</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.0245</td>
</tr>
<tr>
<td>H01B</td>
<td>POSTERIOR PITUITARY LOBE HORMONES</td>
<td></td>
</tr>
<tr>
<td>H01B</td>
<td>Desmopressin and analogues</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>0.0122</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.0037</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.0159</td>
</tr>
</tbody>
</table>

### References:

1. “Prevalence of Symptomatic BPE Among Malaysian Men Aged 50 and Above Attending Screening During Prostate Health Awareness Campaign”. GC Teh, RM Sahabudin, TC Lim, WL Chong, S Woo, M Mohan, A Khairullah, P Abrams, Institute of Urology, Kuala Lumpur Hospital, Malaysia, Bristol Urological Institute, Southmead Hospital, Bristol, UK.