A COLLABORATIVE APPROACH IN REDESIGNING SINGLE USE INTRA VITREAL INJECTION (IVT) SETS FOR ASIAN COHORT

Introduction
Intravitreal Injection is one of the most common Ophthalmic procedures used to treat Age Macular Degeneration (AMD), Diabetic Retinopathy/ Maculopathy, Retinal Vein Occlusion (RVO). It is a highly targeted drug therapy method that involves injecting Therapeutic Drugs into the vitreous cavity through pars plana under aseptic technique.

Project Background
- SNEC performed about 16,000 Intravitreal Injections (IVT) annually.
- This breaks down to an average of 67 injections daily.
- Average turn around for each procedure is approximately 15 minutes.
- With the high volume and turn around, Staff Nurses spent a significant amount of time washing, packing and sending the sets for sterilization after each session. Man-hours & cost per case is shown in Table 1.
- The center maintains a total of 40 sets and turn around time to re-process these sets ready for the daily load must be sustained.

Table 1: Breakdown On Average Time Spent To Re-process Sets Daily

<table>
<thead>
<tr>
<th>Time Required For Washing, Drying and Packing per set of IVT instruments</th>
<th>5 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Reusable Sets used per day</td>
<td>67 sets</td>
</tr>
<tr>
<td>Total Time required to process instruments daily</td>
<td>5.6hr</td>
</tr>
<tr>
<td>Total Time required to process instruments per annum</td>
<td>1344hr</td>
</tr>
<tr>
<td>Labour Cost for SN per hour</td>
<td>$30</td>
</tr>
<tr>
<td>Cost Savings per annum</td>
<td>$40,320</td>
</tr>
</tbody>
</table>

IVT Set Requirements
1. The Instruments within each set are specifically designed to cater to suit the Asian Eyes (Figure 1).
2. The disposable set must be cost efficient and environmentally friendly.

Figure 1: Tight Conjunctiva Exposure On Most Asian Eyes
- Most commercially available disposable instruments are bulky leaving little space to access the correct plane for our Asian population.
- One of the biggest challenges was to find the correct specifications for Eyelid Speculum and Indenter Marker (Figure 2) to cater to Asian Eyes.

Figure 2: Eyelid Speculum with Blades & Indenter Marker

Objective
- Streamline IVT process by having disposable IVT sets to cut down instrument process time that includes washing, packing and sterilization to meet the daily high volume workload.
- To assess potential cost reduction in the IVT process.

Methodology
- We decided to design our own complete disposable IVT set.
- First we engaged and worked closely with Procurement Department to call for an Invitation To Quote (ITQ) to allow us to shortlist suitable companies that would customize our sets.
- Several rounds of customization and testing (Figure 3) were conducted before the final configuration and cost per set was accepted based on long term commitment (Figure 4).

Figure 3
Initial Prototype

Figure 4
Final Design of Disposable IVT Set

- Cost savings in Healthcare is critical. Table 2 shows cost savings of $1.78 ($6.48 - $4.70 = $1.78) per case which translated to $28,480 ($1.78 x 16,000 = $28,480) annual savings.
- Time saved from handling the reusable sets can be channeled to perform more IVT procedures and provide better quality patient care.

Table 2: Cost Comparison and Savings Between 2 practices

<table>
<thead>
<tr>
<th>Cost Incurred Per Case</th>
<th>Previous Practice Per Case</th>
<th>Current Practice Per Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man-hours for Staff Nurses to perform Washing, Packing &amp; Sending to OT for Sterilization</td>
<td>$2.52</td>
<td>NIL</td>
</tr>
<tr>
<td>Autoclaving Cost for Eye Speculums &amp; Eye Callipers</td>
<td>$0.76</td>
<td>NIL</td>
</tr>
<tr>
<td>Cost of Maintaining the Instruments</td>
<td>$0.30</td>
<td>NIL</td>
</tr>
<tr>
<td>Sterile Pack with Consumables</td>
<td>$2.90 (Consumables only)</td>
<td>$4.70 (inclusive of Instruments)</td>
</tr>
<tr>
<td>Total Cost Per Case</td>
<td>$6.48</td>
<td>$4.70</td>
</tr>
</tbody>
</table>

Conclusion
- Collaboration in designing a customized single used IVT set has increased efficiency to cope with our high volume workload with a significant cost savings on man-hours, investments and repair of instruments.
- With time saved, nurses no longer need to stay back late to wash and re-process the instruments. Survey has also shown the extremely high satisfaction rate among nurses.
- The single used IVT set also offers a much safer alternative to prevent infection and promote patient safety.