

### 3. RESULTS

#### 3.1 SSD Survey Results:

Results from the survey circulated to SSD members of the IDI is presented graphically below. Graphs are presented under the headings used in the survey (Appendix 1).

#### Part A: General Information

Figure 3.1.

Numbers of Hospitals versus Hospital Type

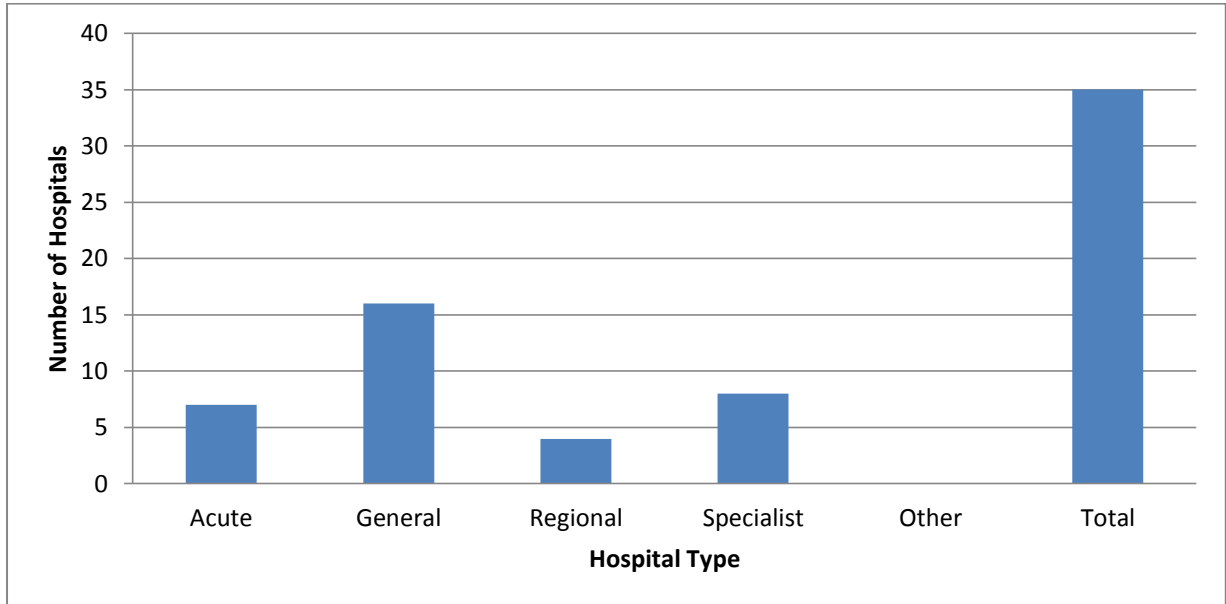
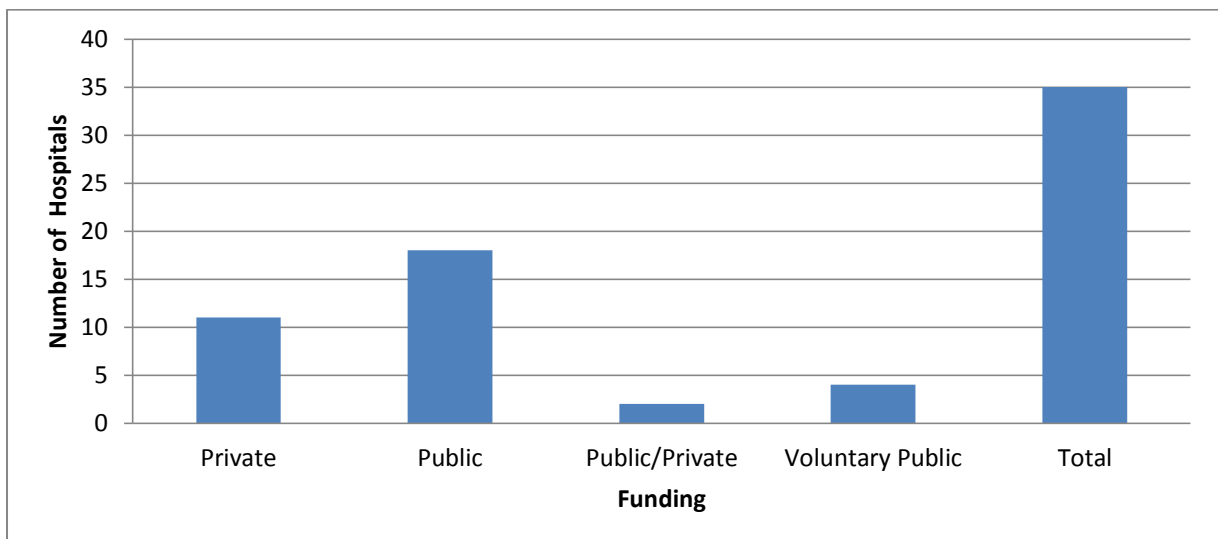


Figure 3.2

Numbers of Hospitals versus Type of Funding



**Part B: Sterile Services Department Details**

Figure 3.3.

Number of SSD's versus Number of Employees in Department

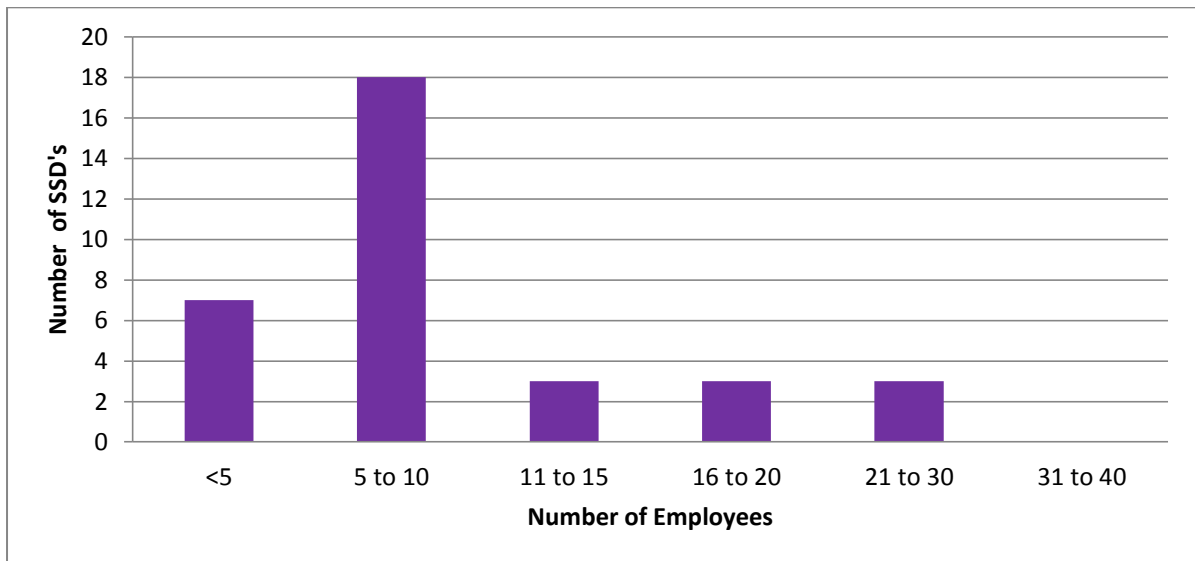
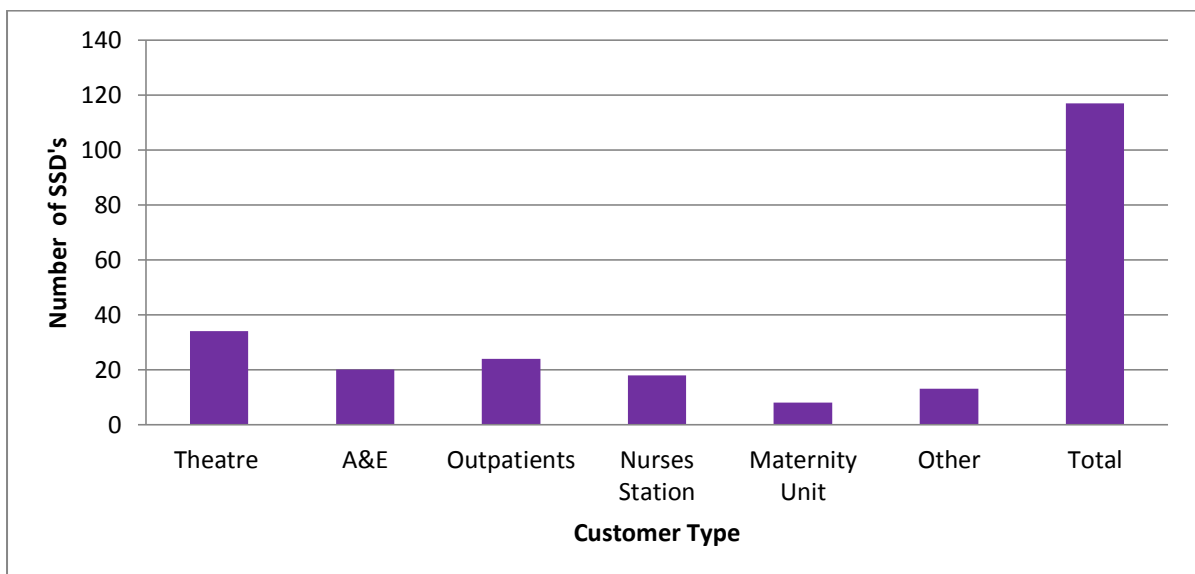


Figure 3.4

Number of SSD's versus Type of SSD Customer



Other: ICU, Recovery, other Hospitals, Dental Clinics, Radiation Therapy, Pharmacy

**SSD Processing Information:**

Figure 3.5  
Number of SSD's versus Number of Sets Processed per Day

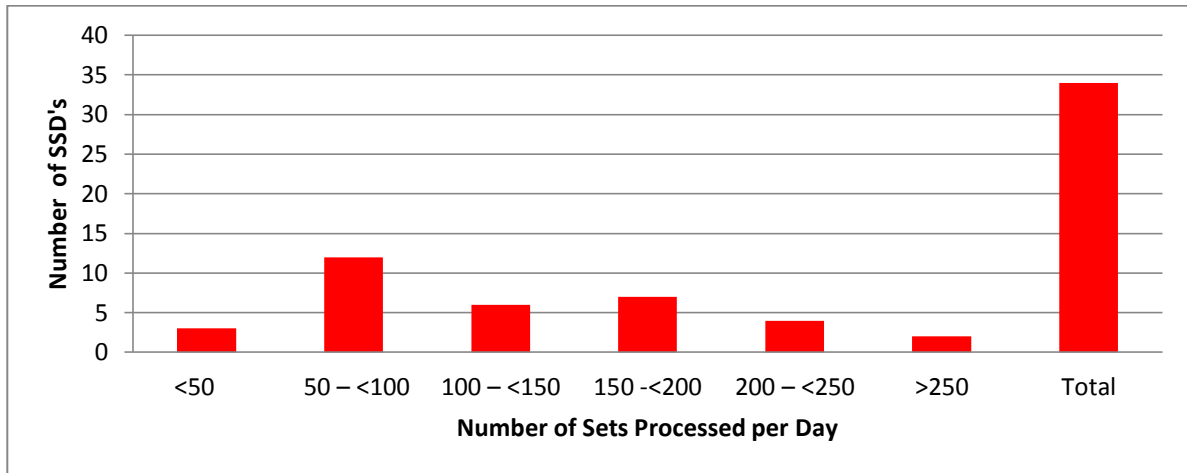


Figure 3.6  
Average Number of Instruments per Set versus Set Type

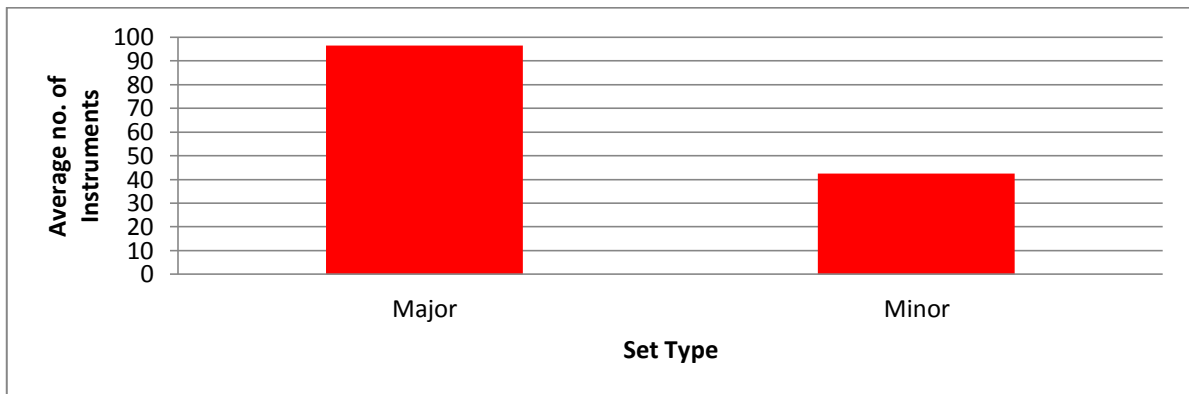


Figure 3.7  
Number of Single Items Processed per Day versus Number of SSD's

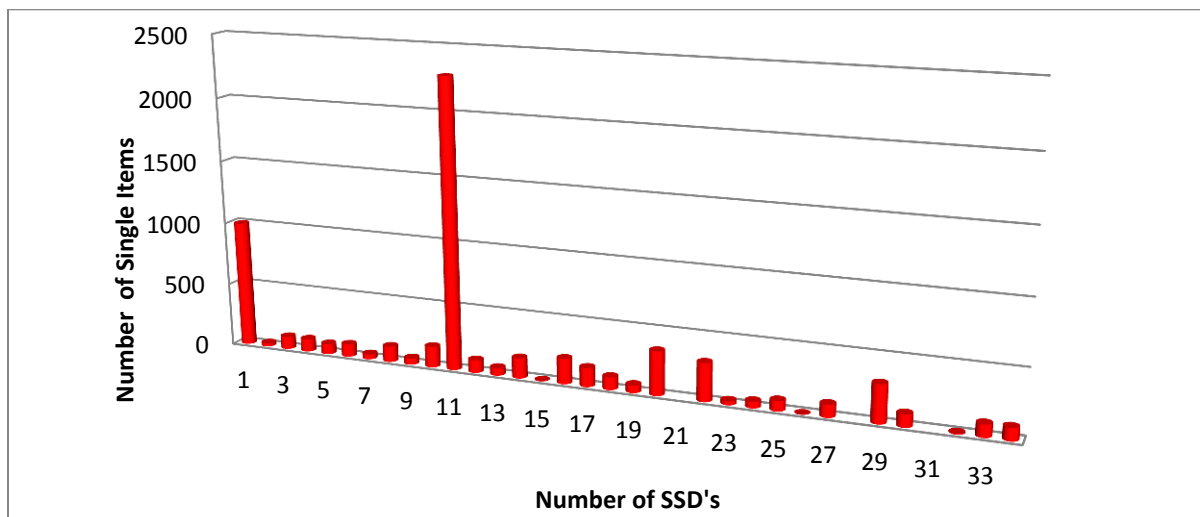


Figure 3.8

Number of Scopes Processed per Day versus SSD Number

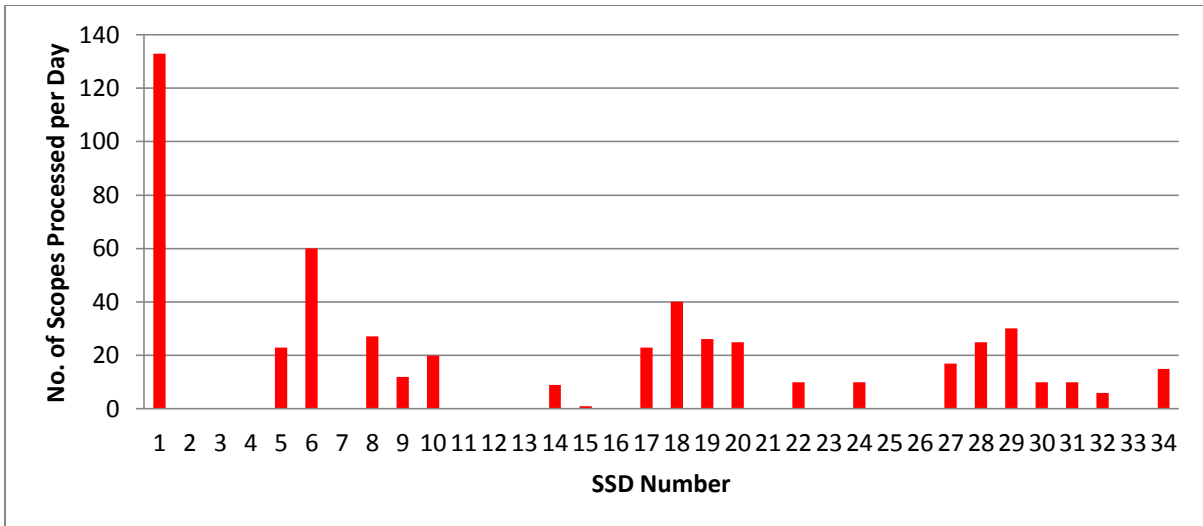
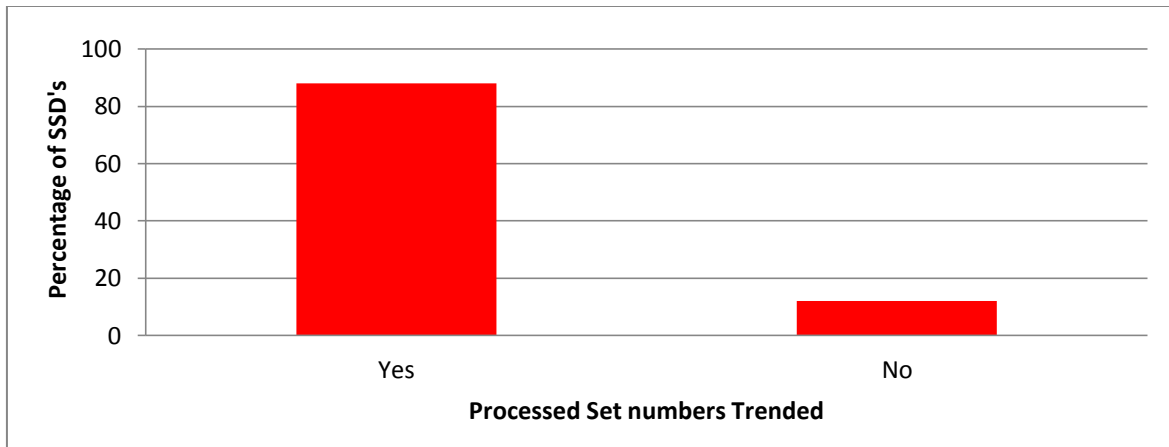


Figure 3.9

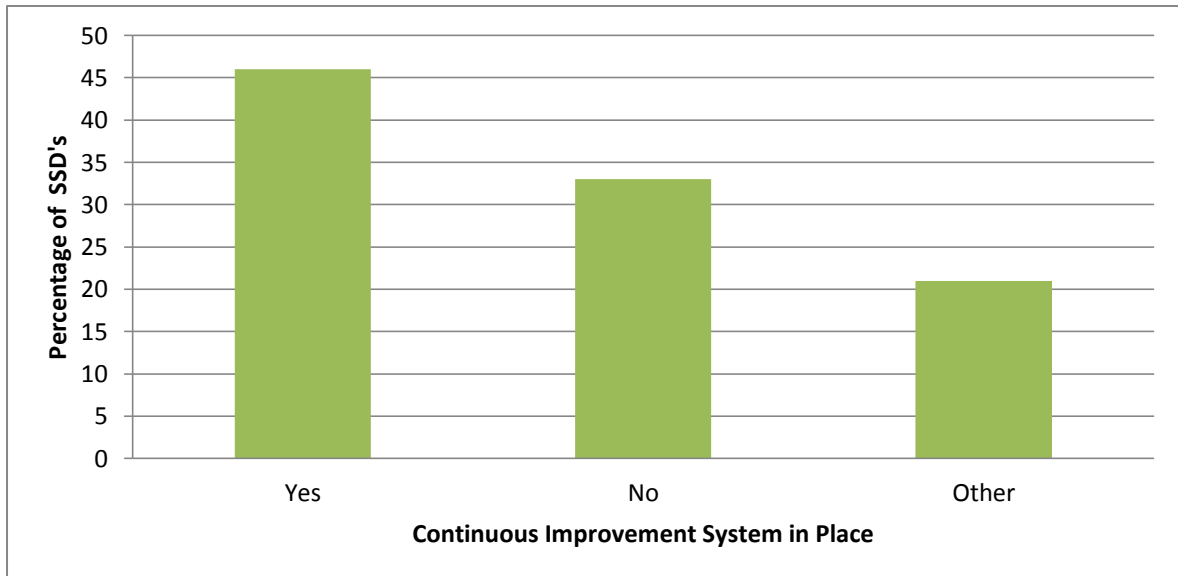
Percentage SSD's versus Processed Set Numbers Trended Weekly/Monthly



## Part C: Continuous Improvement Information

Figure 3.10

Percentage of SSD's versus Continuous Improvement System in Place



Other: refers to a quality standard e.g. ISO13485, hygiene or risk standard

Figure 3.11

Number of SSD's versus Type of Continuous Improvement Method in Place

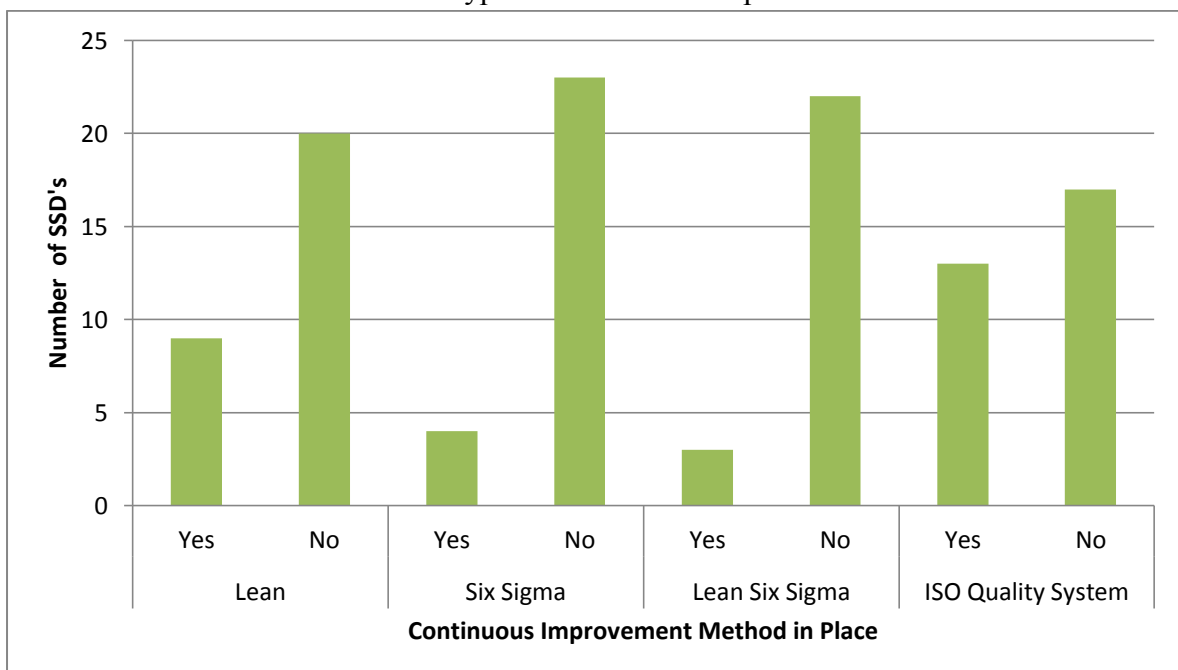


Figure 3.12

Number of SSD's versus Type of Performance Measure in Place

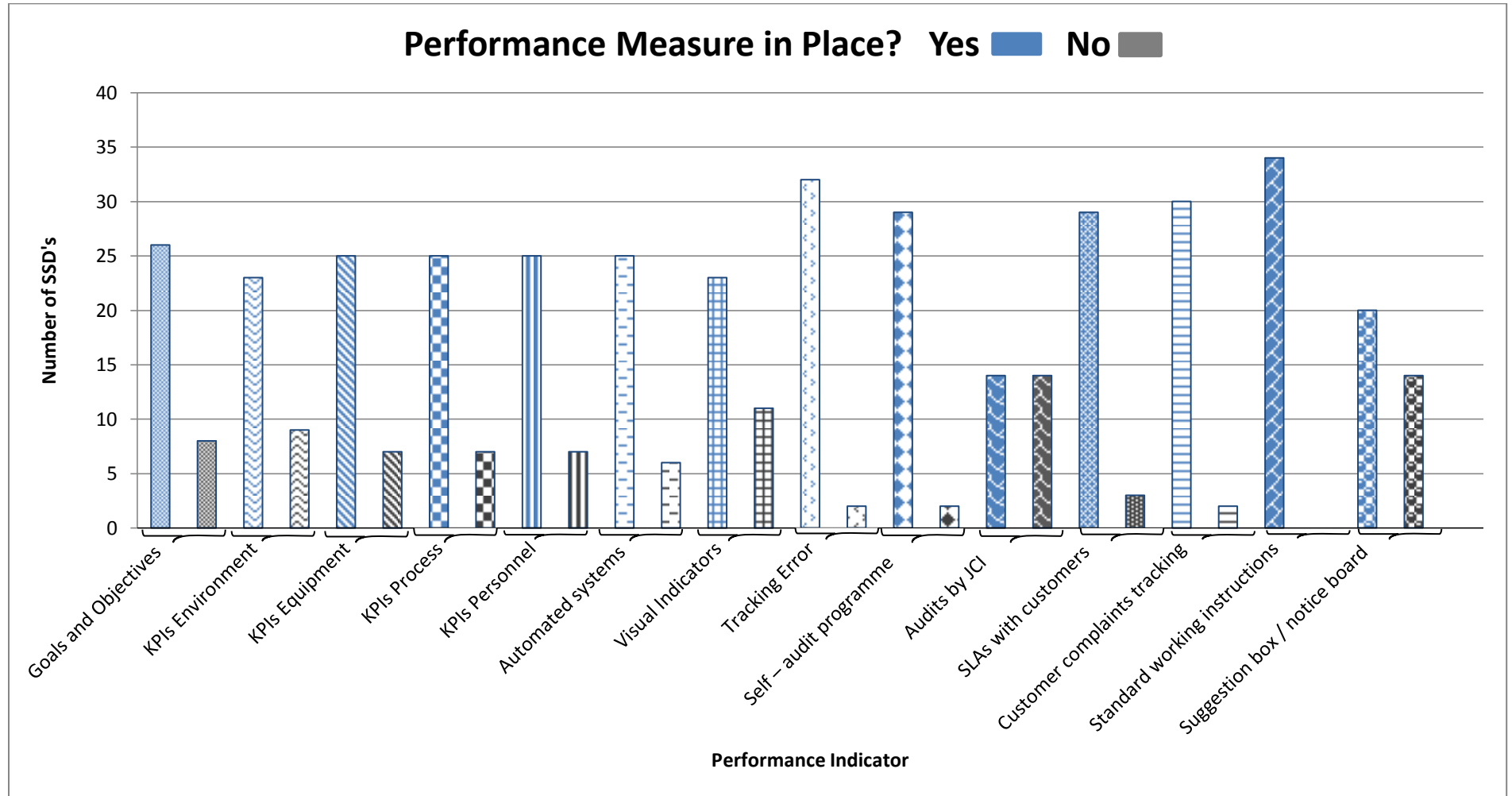


Figure 3.13

Number of SSD's using Continuous Improvement Techniques versus Type of Technique used

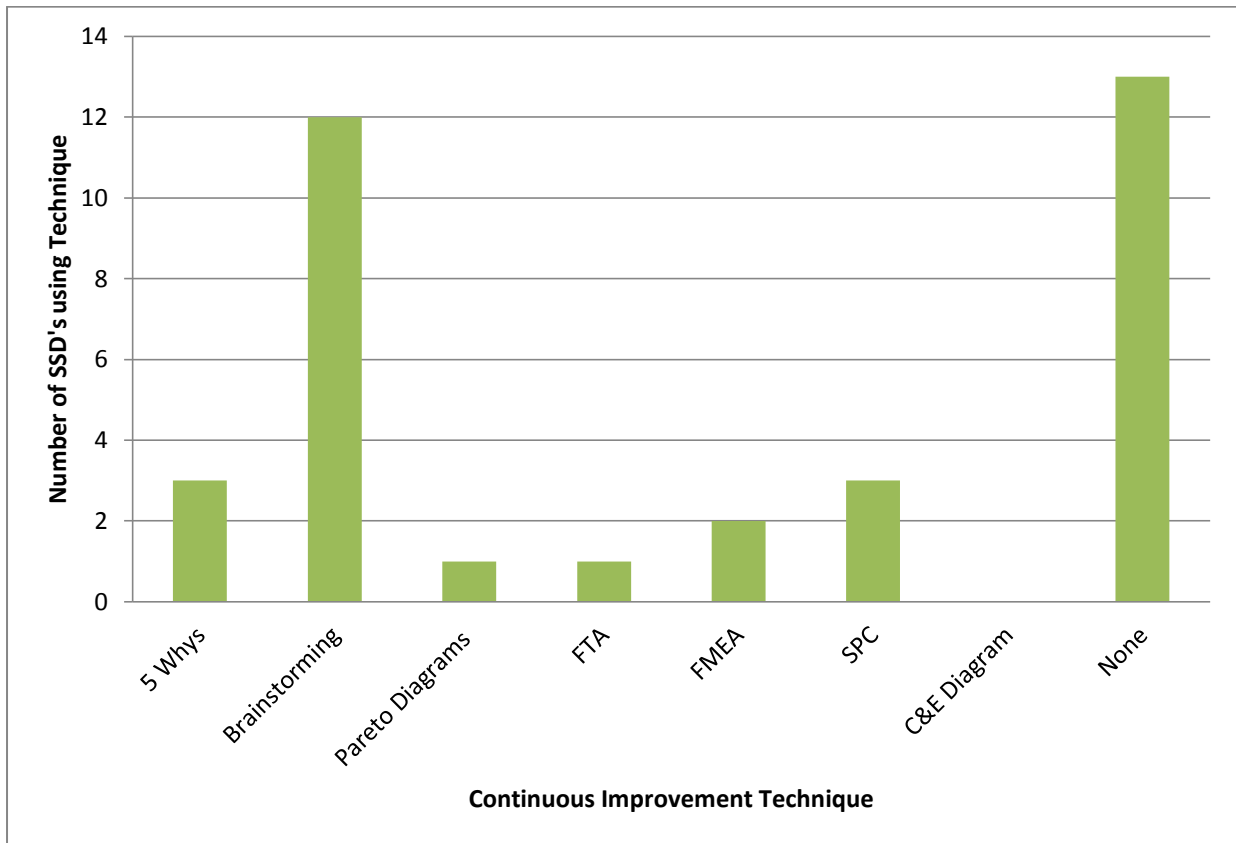


Figure 3.14.

Percentage of SSD's versus Predictability of Work

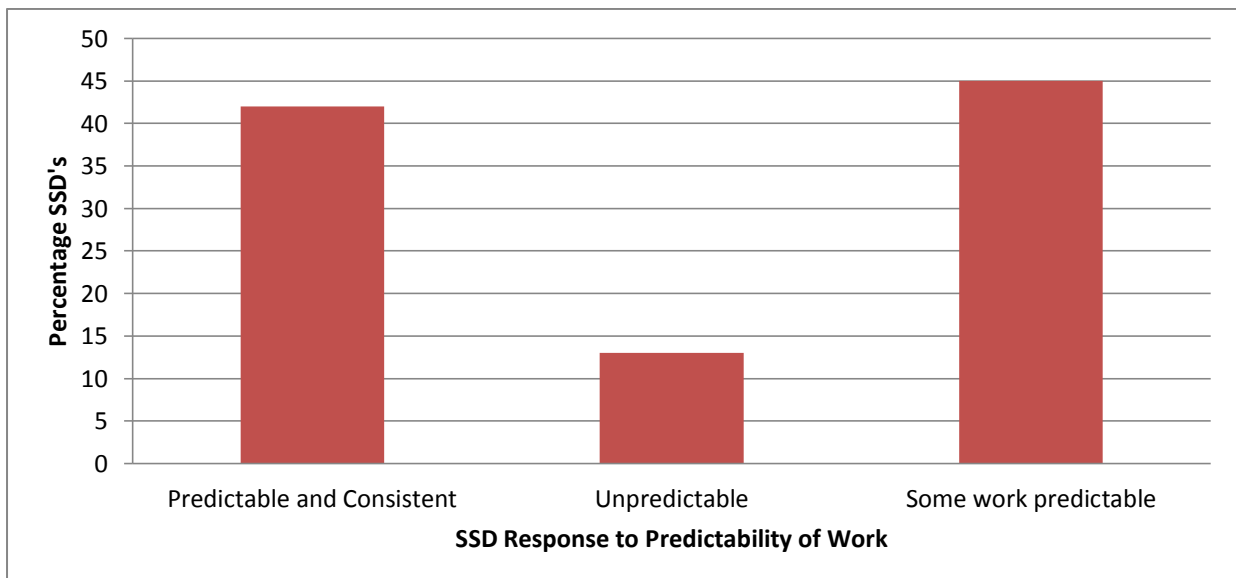


Figure 3.15  
Wasteful Activities in SSD versus Percentage Most Wasteful

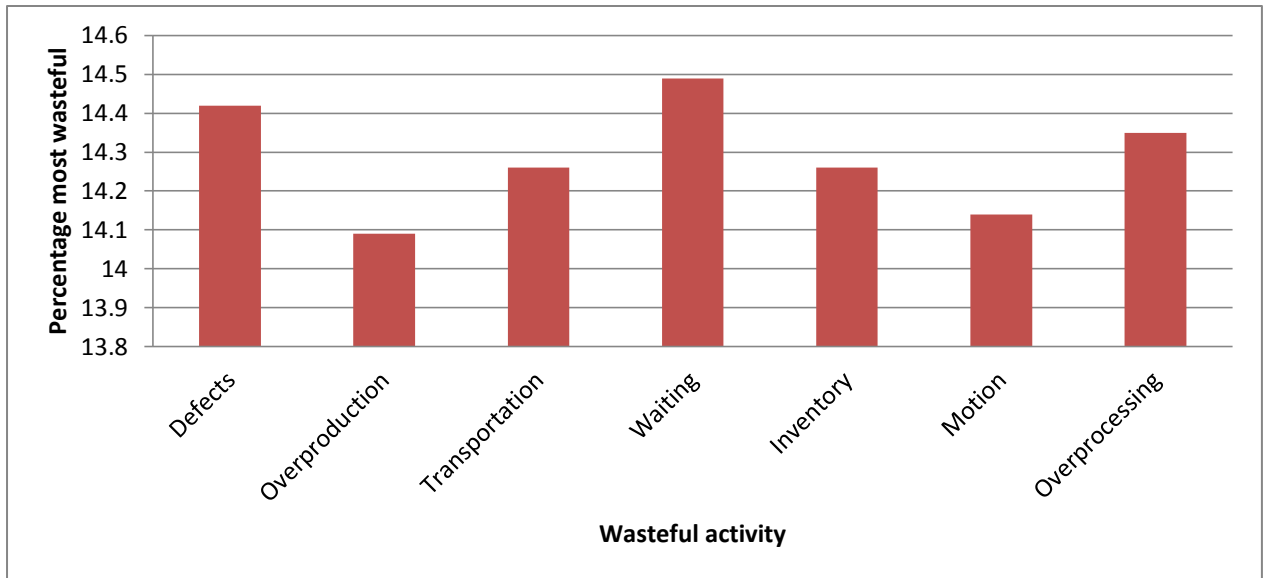


Figure 3.16  
Roadblocks to Efficiency versus Percentage Occurrence in SSD

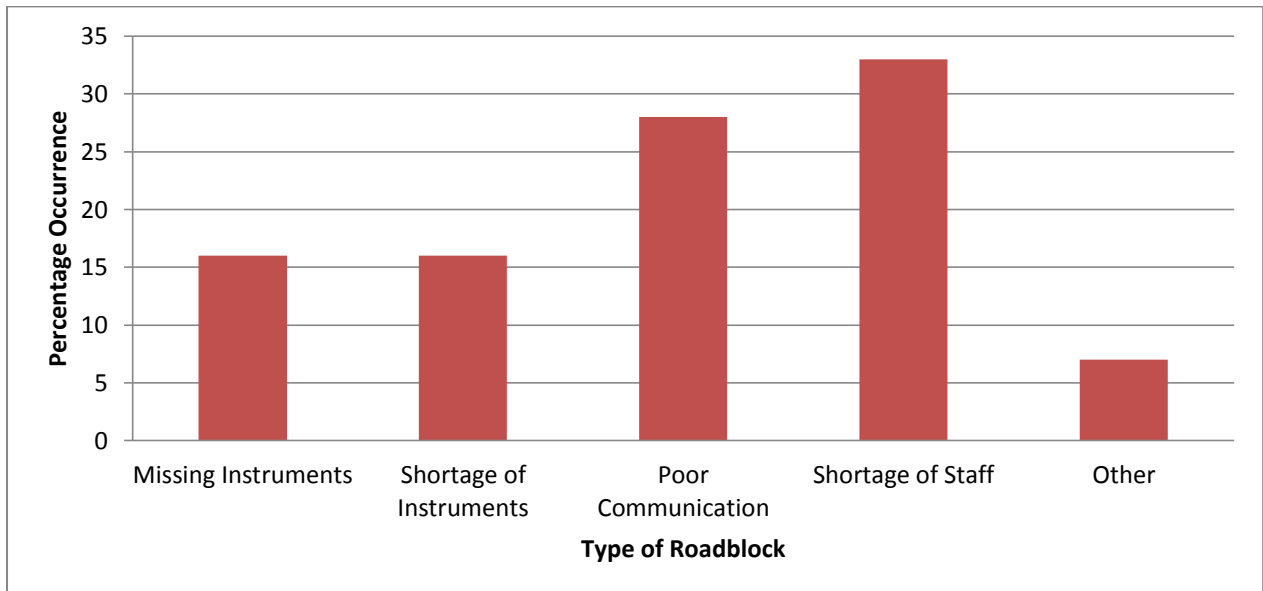




Figure 3.17  
Percentage Respondents versus Respondents Knowledge of Lean

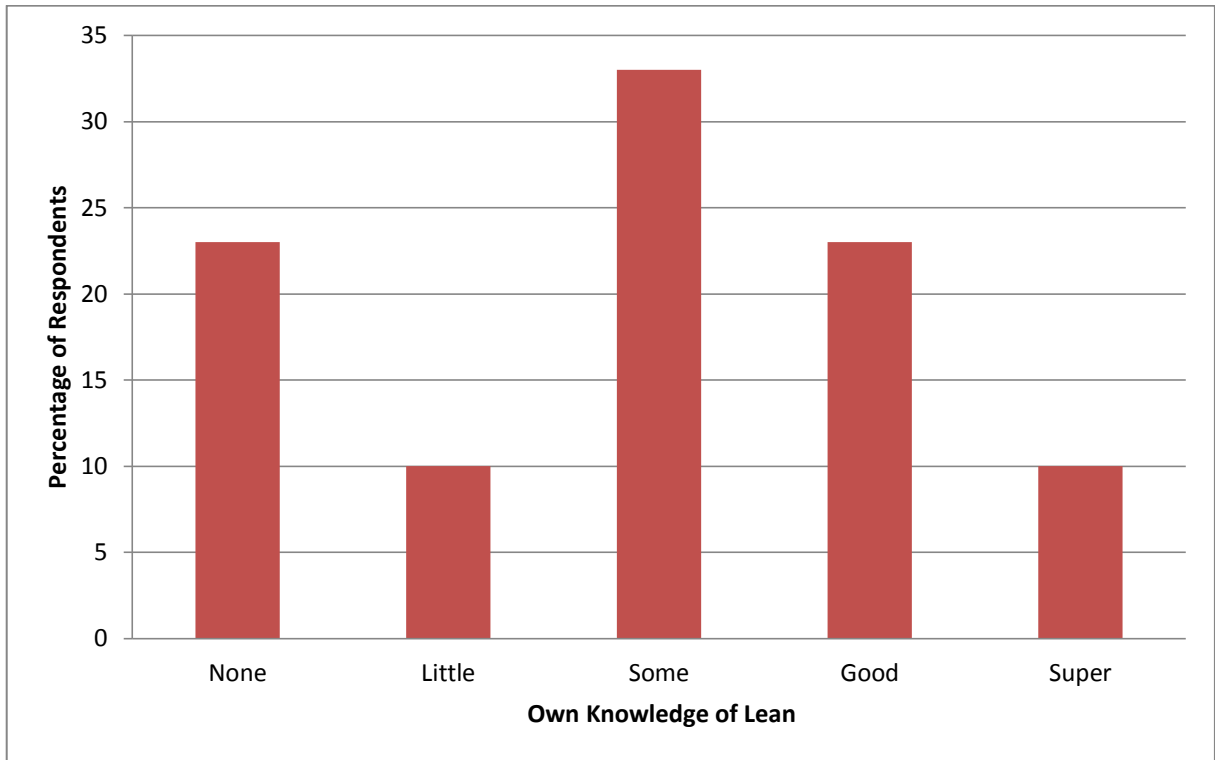
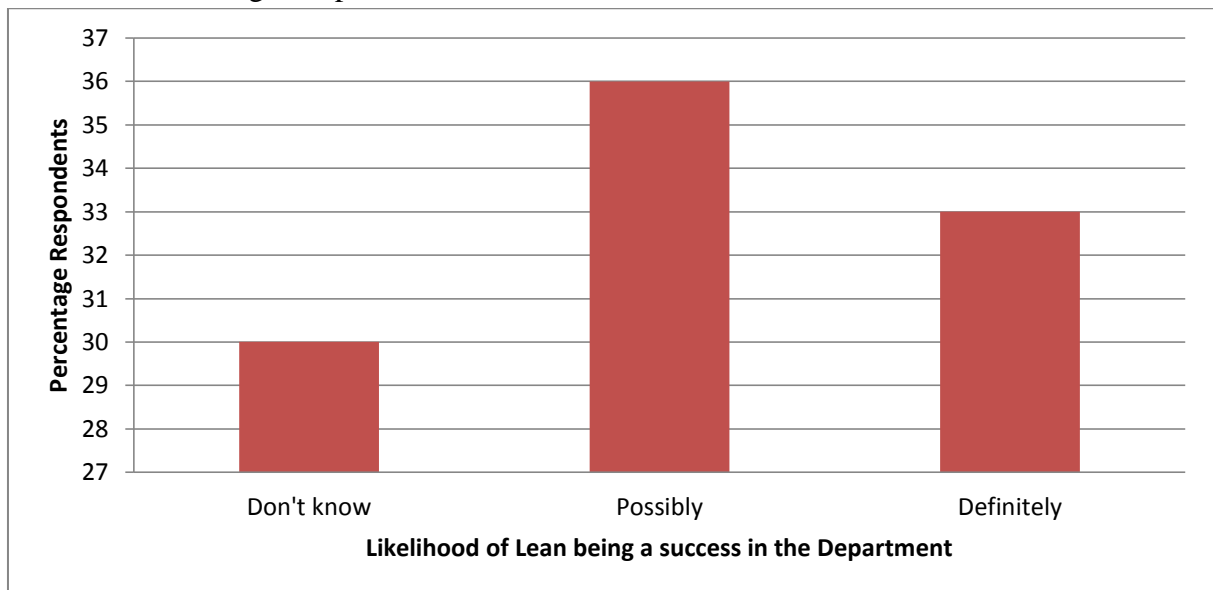


Figure 3.18  
Percentage Respondents versus Belief that Lean could be a Success in SSD



## 4. DISCUSSION

### 4.1 SSD Survey:

A survey of SSD's was conducted with the aid of the IDI to assess at what level industry-based performance improvement initiatives are in use in Irish hospitals. The data collected from the survey was provided by 34 out of the 62 SSD's surveyed (response rate of 55%). Completed surveys were received from a representative spectrum of hospital types such as Acute (6), Specialist (8), General (16) and Regional hospitals (4) across Ireland. The group of hospitals surveyed cover private, public, public/private and voluntary funded hospitals. (Figures 3.1 and 3.2). The question in relation to funding was posed in order to determine if there was a link between use of performance improvement methods and funding.

The average number of employees in SSD's is between 5 -10 for over half (18 out of 34) of those surveyed with larger hospitals having employee numbers of 11 to 30 (9 hospitals). The type of customer serviced by SSD is similar in all hospitals surveyed. The Operating Theatre accounts for approximately 30% of the workload, with A & E, outpatients and nurses stations accounting for approximately 20% each. (Figures 3.3 and 3.4)

SSD sterilises reusable invasive surgical instruments which are placed in surgical sets. Set's of instruments for different types of operations can be minor such as those for a hernia (average 40 instruments) or major such as those for orthopaedic surgery (average 90 instruments). Over one third of SSD's surveyed (35%) sterilise between 50 -100 sets on average per day with approximately 39% sterilising between 100 – 200 sets daily. Two hospitals sterilise over 250 sets daily. In addition to sets, SSD's also pack and sterilise single items and scopes. The average number of single instruments processed by SSD's is between 50 -100 per day. The number of scopes processed per day is on average between 10-30. It is difficult to determine if there is a correlation between staff numbers and workload due to the variability in the number and size of sets, instruments and scopes processed, some of which are manually decontaminated.

The enormous volumes of instruments processed daily highlights the huge challenges faced by SSD's in processing, managing and tracking instruments. An automated system for tracking instruments is an essential requirement for SSD's yet several hospitals surveyed (7) are using a manual paper based system to track instruments/sets due to lack of funds.

An encouraging 88% of SSD's surveyed trend their output at least monthly (Figure 3.9). Under half of respondents (46%) have a continuous improvement system in place, 33% have no system in place and at least 21% operate in accordance with a standard such as ISO 13485 or a hygiene standard (Figure 3.10). 8 hospitals out of 34 surveyed (24%) have elements of Lean in place, 4 use Six Sigma for SPC and 3 use Lean Six Sigma (2 respondents of the 3 had also ticked Lean and Lean Six Sigma boxes). 3 respondents who ticked the Lean box on the questionnaire indicated that they have only one element of Lean in place such as 5S or Kanban for management of ancillaries from stores. Thus it can be said that only 5 out of the 34 hospitals surveyed (15%) are using more than 1 of the Lean tools such as VSM, DMAIC, SPC, Kaizen, Kanban and 5S. Of the 8 respondents who have a continuous improvement system or elements of a continuous system in place, 7 are privately funded and one is voluntarily funded. (The voluntary public hospital, R.V.E.E.H., is where I carried out the Lean study). Results indicate therefore that performance improvement initiatives such as Lean or Six Sigma are much more likely to be implemented in a private hospital where funding is more readily available than a public hospital where funds are less readily available. This is very unfortunate and an oversight as it has been shown in the literature that huge savings can be made from having introduced performance improvement initiatives. Just under 13 surveyed operate in accordance with ISO 13485 the quality standard for medical device manufacturer's (Figure 3.11). This standard must be complied with by medical device manufacturer's in accordance with Medical Device Directive 93/42/EEC.

Of those respondents who have implemented Lean principles all commented positively:

Comment 1 –

*'Having a Lean project conducted in my hospital for CSSD has been very beneficial and identified many areas where improvements on resources and time can be saved.'*

Comment 2 –

*'We have implemented a Kanban labelling system in the sterile store which is very effective. Before this system we were constantly called to find instruments by nurses. We have implemented a colour coded system with each surgical speciality given a colour. We are not asked to find instruments as frequently as before, saving our precious time and enabling theatre nurses to find their instruments.'*

Comment 3 –

*'We implemented Lean 2 years ago and found a huge amount of waste was caused by our customers not following protocols/SLA's. Our quality initiative process is implemented and monitored externally to good effect and we also randomly audit using 5S in the department.'*

With regard to performance measures it is interesting to note (Figure 3.12) that 7 SSD's have not identified goals and objectives. 25 out of 34 SSD's have Key Performance Indicators (KPI's) in place for environment, equipment, process, personnel and also automated systems for tracking, monitoring and recording the process. Just over two thirds of SSD's have visual indicators of performance and 32 out of the 34 SSD's surveyed track errors such as missing instruments/unclean instruments. 29 out of 34 have self-inspection audit programmes in place. Half of those surveyed are accredited by the American organisation Joint Commission International (JCI). JCI accreditation is required by certain medical insurance companies such as the Voluntary Health Insurance (VHI). 29 out of 34 SSD's have Service Level Agreements (SLA's) in place with their customers. 30 out of 34 SSD's track and follow up on customer complaints. All SSD's surveyed have standard operating procedures in place. Just under two thirds have suggestion boxes for process improvements. The HSE Code of Decontamination Practice (2011) requires SSD's to have in place KPI's, an independent monitoring, tracking and recording system, a self-inspection programme, a non-compliance system and SLA's with customers. Most SSD's are in compliance with the HSE standard. This standard does not have a requirement to identify goals and objectives and would explain why 7 hospitals surveyed have not identified goals and objectives .

Brain storming is the most popular problem solving technique (12 out of 34 surveyed) in SSD's (Figure 3.13) most likely because it is the best known and simplest technique. 13 SSD's (38%) surveyed do not use any problem solving technique.

With regard to determining whether work flow is level (Heijunka), just under half of those surveyed responded that the work was predictable, 5 responded that it was unpredictable and just under half responded that some work was predictable (Figure 3.14). Level workflows are an important element of Lean synchronisation and requires the mix and volume of flow between stages to be level over time. Although difficult to put in place the benefits of a predictable or level workflow can be substantial. (Slack *et al*, 2010). One respondent commented that *'Demand placed on the department is inconsistent throughout the day and is driven by customers. Lean would largely be dependent on reorganisation of departments feeding HSSD to produce a smooth work flow..'* This is a valid comment and highlights the fact that Lean cannot operate in isolation in one department. It must be rolled out to all departments in time if its full benefits are to be realised.

Respondents were asked to score the most wasteful activities in SSD using the waste classification system of Graban (2008) from 1 (most wasteful) to 7 (least wasteful). The results were converted

into percentages. Results (Figure 3.15) indicate that there is no significant difference (0.4%) between the 7 types of waste. Thus all types of waste are viewed as equally wasteful in SSD.

In terms of roadblocks (Figure 3.16), shortage of staff and lack of communication were identified as the biggest obstacles by approximately one third of respondents, with missing instruments and shortage of instruments the next biggest issues identified by approximately one eighth of respondents. (some respondents identified more than one issue). This is not surprising considering the enormous volumes of instruments processed daily and where nearly one quarter of SSD's surveyed do not have an automated tracking system in place. Other obstacles identified include: communicating incorrect information e.g. stating instruments are urgently required when they are not, breakdown of equipment and lack of sufficient training.

With regard to respondents knowledge of Lean (Figure 3.17), over 60% have little or no knowledge of Lean with just over 30% having at least a good knowledge of Lean. The response to the question 'Do you think Lean could be a success in your department?' was varied as expected (Figure 3.18) based on respondents knowledge of Lean, with 36% of respondents of the opinion that it possibly could be successful, 34% of the opinion it definitely could be of benefit and 30% not sure presumably because they are not familiar with Lean concepts.

A review of issues identified in publications from SSD's where Lean exercises were performed highlight similar issues to those identified by SSD's who participated in this survey. Common issues identified in the literature include:

- Instruments lost, missing in transit (Gowland and Bryant, 2011)
- Reactive work from Theatres (telephone calls, chasing up), Progress of activities to meet daily targets not readily identifiable, Instruments requiring rework, Missing instruments, Poor layout and design of clean room resulted in excessive motion and transportation (KM&T, 2011)
- Equipment not adequately maintained resulting in downtime and lost hours (Lacey, 2010)
- Improper staffing schedule doesn't meet workload demand (Johnson, 2005)
- Reprocessing additional sets due to sets being opened due to insufficient instruments (Castle and Harvey, 2007)