



**SOCIETY OF PM PROFESSIONALS**  
*of* GREATER VANCOUVER

HISTORICAL ANALYSIS *of*  
REGISTRATION APPLICATIONS  
*for* PROFESSIONAL  
DEVELOPMENT SEMINARS  
2001 – 2015

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# Historical Analysis of Applications for Professional Development Seminars 2001 - 2015

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## INTRODUCTION AND SUMMARY

Historical records were assembled for the 745 individuals who collectively submitted 4,430 applications to register for attendance at 75 professional development seminars during the 15 year period 2001 through 2015. This is an initial report on the findings from an analysis of the data. The purpose of the analysis was to identify the factors that may explain the observed decline in participation in the seminars sponsored by the Society of PM Professionals in Vancouver B.C. Further investigation of these factors will provide a basis for developing plans to reverse the decline.

A natural attrition in the population of applicants with the passage of time, at a rate that exceeded the inflow of new applicants, was identified to be the predominant mechanism underlying the long term decline in registration applications. A major source of new applicants during the period 2001 through 2007 has subsequently disappeared. The number of new applicants from other sources has declined with time, possibly reflecting the growing availability of alternative sources of PDUs. The trend of diminishing participation due to demographic factors has continued, to the point that a program of seminars for 2015 and into the future may not be sustainable in its historical form.

If more seminars are offered in a given year, more applications are received, as would be expected. Other factors which had one-time effects on the numbers of applications in individual years were observed. The pattern of variations in applications received suggests that the inability to accommodate all of the applicants in particular years in the period 2004 through 2008 may have had a chilling effect, discouraging subscribers from submitting applications in alternate years. The provision of in-house continuing education in 2008 by BC Hydro, the employer of a substantial portion of the applicants in the years through 2007, may explain the subsequent decline in applications from that group. Similarly, the layoff of Accenture staff, following the loss of the BC Hydro contract, may explain in part the peak in applications in 2012 and the decline in the years following.

A Pareto analysis, of the frequency with which individuals applied, revealed that a full third of the 745 individuals applied only once, accounting for only 5.6% of the total applications. At the other extreme, the most active 15% of the applicants generated 50% of the applications. The results from this analysis will be helpful in segmenting the population of applicants for making comparisons of preferences and behavioural intentions using survey data.

There are two broad strategies for maintaining or increasing the number of applications for registration at professional development seminars in the future:

- a) attract new applicants at an annual rate that exceeds the natural demographic decline
- b) encourage more participation from the existing population of subscribers

The analysis of historical data indicates that, without a continuing stream of new applicants, the natural decline in applications from an ageing population, combined with a diminishing intake of new applicants, can be expected within 3 years to result in an annual number of applications sufficient to support four seminars attended only by 35 to 40 registrants. This is a higher estimate than the 30 to 35 registrants cited in the April 3, 2016 edition of this report.

Projections of the relationships revealed through this analysis, for alternative scenarios, will be useful in setting targets for annual intakes of new applicants in the future. It is estimated that 37 new applications for registration will be required each year in order to maintain the level of participation seen in 2015.

The most promising prospect for increasing the intakes of new applicants is to publicize the professional development seminars to the entire population of PMPs in the lower mainland using the e-mail distribution list of the West Coast PMI Chapter.

The identification of potential strategies to encourage more participation from the existing population of subscribers will be the subject of discussions on April 13, 2016. Plans will be made for collecting evidence on the efficacy of alternative strategies, including plans for collecting survey data where appropriate. The results of the present study, the Pareto analysis in particular, will allow for the identification of segments of the subscriber population for sample design, data collection, and the subsequent analysis of differences in preferences and intentions.

Offering more seminars will increase the number of applications in a year, but, according to the findings, by itself will not increase the average attendance per seminar in the current year or future years.

### **The Population of Applications and Individuals**

The data for the analysis consisted of 4,430 registration applications submitted for the 75 professional development seminars during the years 2001 through 2015. The majority of the records came from the registration spreadsheets, created by the Registration Managers for the seminars. These files were not available in the Society archives in every instance, and several were obtained from the individual records of members of seminar management teams. The aim was to assemble a complete record of all the persons who registered successfully, cancelled, or were waitlisted, and so to obtain a measure of total registration applications as an indicator of participation.

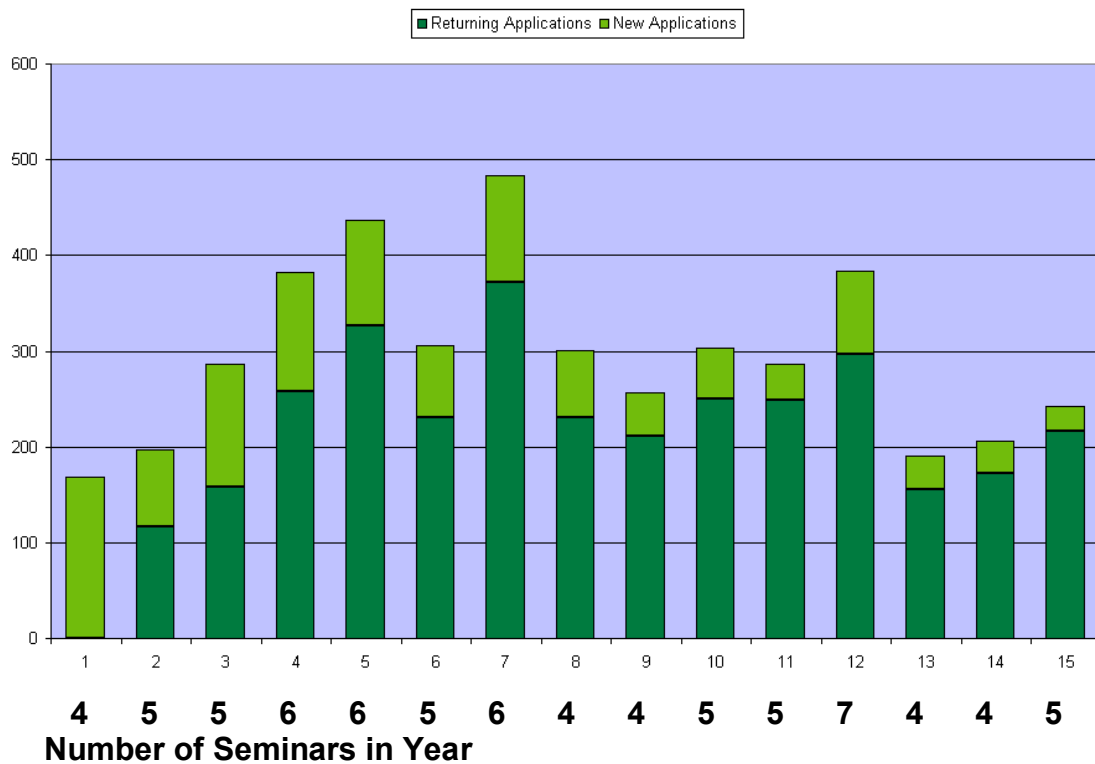
There were instances in which the registration worksheets were simply not available, and the list of registrants from the seminar binder was used in its stead. The binder list was sometimes supplemented with information, from other documents, on those who cancelled, were waitlisted, or both. It is estimated that about 223 applications were missed, 5% or so. About 121 in 2005, 83 in 2007, and 19 in 2009. While it is unfortunate that the data were not complete in this regard, the effect was mitigated by the fact that the names of most of the individuals listed in the missing records would have appeared again in the same year, or as new applicants in the following year. One effect was to slightly overstate the retention rate of application numbers from year to year, as discussed in a subsequent section of this report. The other effect was to slightly understate the frequency of application for some individuals, as observed in the discussion of the Pareto analysis below. Neither of these effects was great enough to undermine the conclusions drawn from the statistical analysis, given the amount of variability from all sources. .

Each record in the data base contained first and last name, e-mail address, and seminar date and number. After the records were sorted by name, they were further tagged for each individual by first and last seminar, number of applications made, and by referring source for first application.

### Demographic Decline – Diminishing Applications from Diminishing Populations

The total number of seminar registration applications received in each of the fifteen years is plotted on the histogram in Figure 1, below. Years 2001, 2002, 2003, etc. are labelled as 1, 2, 3, etc. Also shown along the bottom of the Chart is the number of seminars held in each of the years.

**Figure 1. Total Applications by Year**

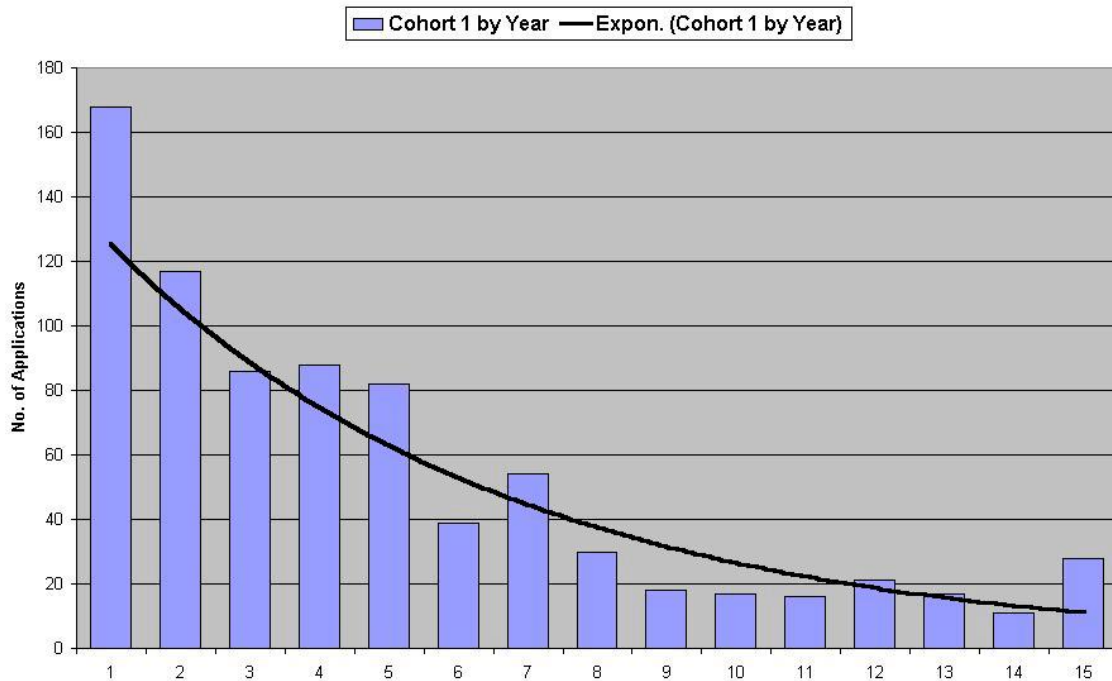


Just by observation, there appears to be a weak correlation with the number of seminars offered in a year, as one would expect, combined with a long term decline after the peak years, and overlaid with dramatic variations from year to year in some cases.

Within the columns of total registrations are stacked two columns: the number of “new” registration applications on top of “returning” applications. The new applications are from individuals who had never applied for registration in an earlier year, while the returning applications are from individuals who did apply in earlier years. For the year 2001, all the applications are new. Each set of new applications was labelled as belonging to a distinct group of individuals, or cohort. The new applications from 2001 were assigned to Cohort 1, those from 2002 to Cohort 2, and so forth.

To gain an insight into the mechanism of growth and decline in the number of applications, the records in the data base were separated according to cohort, and the pattern of application numbers by year was examined for each cohort. Figure 2 is a histogram plot of total applications by year for Cohort 1. A trend line has been superimposed on the chart to trace an exponential decrease in the numbers of applications produced by Cohort 1 with time. Similar charts and fitted trend lines were prepared for the other cohorts, and the same pattern of exponential decline was observed in each case.

**Figure 2 - Cohort 1 Applications by Year**



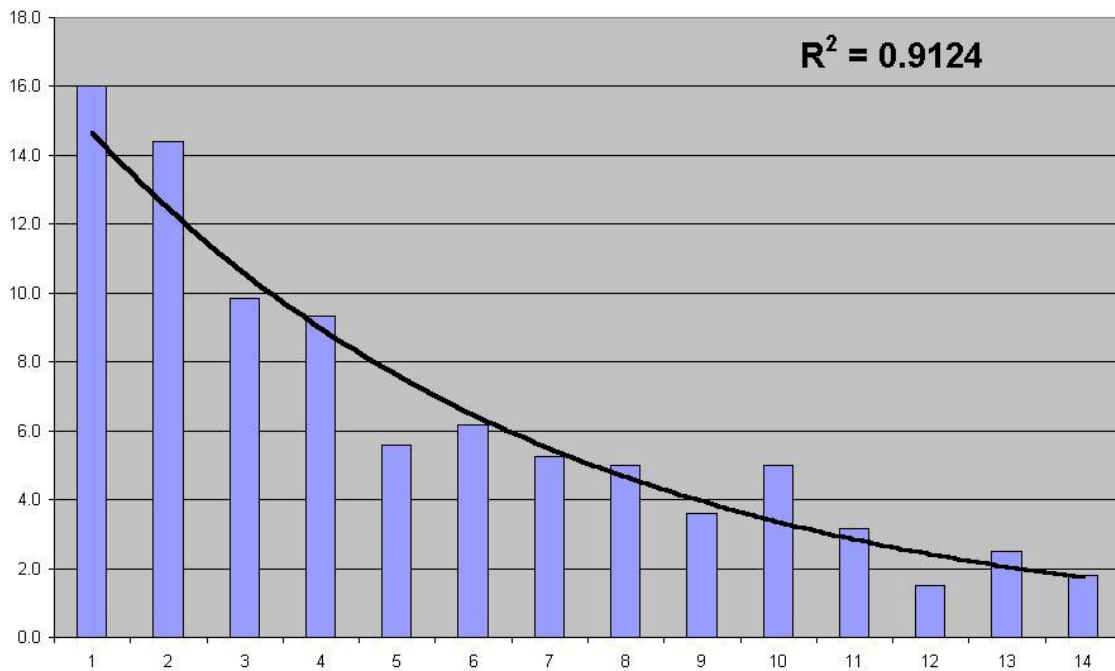
It is a common observation in the study of population dynamics that a given population of individuals will decline with time through mortality and departures, with a year over year decrease that is a constant proportion of the surviving members. This yields an exponential decline with time. And so it is with a cohort of PMPs who all first apply for registration in a seminar in the same year. With time, members of the cohort die, retire, move away, or change career focus. The remaining number in the cohort tends to diminish by the same proportion or percentage each year, as a characteristic of that population. The number of seminar applications generated by the cohort diminishes in the same pattern.

In any given year then, the total of all surviving members of all cohorts combined will generate seminar applications at some average rate. In the subsequent year, the combined total will diminish by the characteristic rate of decline for the population, and so will the number of applications generated, unless of course there is an inflow of new members to maintain or increase the level of the total population. All the evidence from the analysis of the data is that each cohort of PMPs, and hence the entire population of surviving members, has been eroding at a consistent rate. This is demographic destiny.

As noted earlier, a visual examination of the pattern of total applications by year suggests that there is a weak correlation with the number of seminars in a year. To test this connection, the number of applications in each year was divided by the number of seminars, and the analysis of decline with time was repeated for the annual average number of application per seminar – both for individual cohorts and for the combined population. . In the result, there was stronger correlation with an exponential trend line for applications per seminar than for total applications. The important implication of this finding is that by increasing the number of seminars offered in a year, the total number of applications will similarly increase, at least over the range of four to seven annual seminars observed in this study.

The case of Cohort 2 illustrates the greater strength of correlation, and the better fit to the exponential trend for average numbers. Figure 3 shows the extremely close fit of the trend line to the average number of applications per seminar in each year for Cohort 2.

**Figure 3 - Cohort 2 - Applications per Seminar**



$R^2$  value for average number of registrations: 0.9124

$R^2$  value for total number of registrations: 0.8632 (chart not shown)

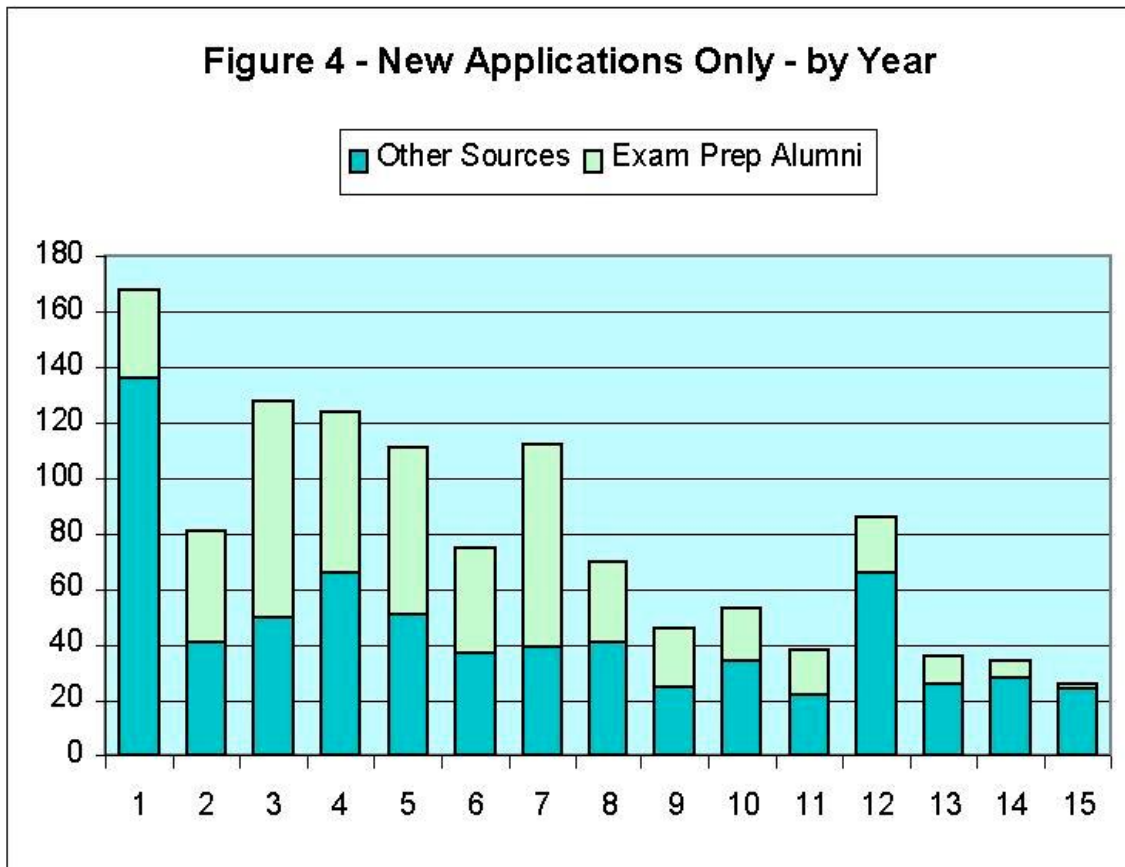
These are both remarkably high values for  $R^2$  which is a measure of the proportion of the statistical variance explained by the fitted trend line, with a maximum value of 1.00 representing a perfect correlation with no statistical variation.

## SOURCES OF NEW APPLICATIONS – DISAPPEARANCE AND DECLINE

So, if the population of PMPs that has generated seminar applications naturally declines, and the number of applications similarly declines, how is that population replenished?

The historical answer to the question is presented in Figure 4, which shows the total number of new applications for each of the fifteen years in the record. A new application is an application from an individual who has not applied in an earlier year, and hence is an addition to the population of applicants. Each of the new groups of individuals has been labelled a cohort.

As shown on Figure 4, there were large numbers of new applications in the early years, ranging from 100 to 170 per year for five of the first seven years. The numbers have declined with time, until by 2015 there were only 26 new applications.



Each column of total applications in Figure 4 is made up of two components, stacked one upon the other. The upper component reflects the number of applications from alumni of the PMP Exam Preparation seminar in Vancouver. These alumni make up 39% of the total population of applicants, but over the fifteen year period, these alumni have contributed 49% of all the seminar registration applications received (2,165 of 4,430). Upon receiving the PMP certification, the exam prep alumni were placed on the list for receiving e-mail notifications of Society events.

As enrolment in the Exam Preparation seminar declined in the period 2008 - 2012, the number of new registrations from this source correspondingly diminished. From a high of 78 in 2003, the registrations from the alumni segment fell to only two for the 2015 cohort. The prospects for future enrolment in this course suggest that this will not be a source of new registrations in the future.

The remaining 51% of new registrations over the years came from other sources. In 2001, the founders of the Society were provided with the e-mail addresses for all PMPs in the province through the West Coast BC PMI Chapter. Many of these PMPs had attended the Chapter sponsored exam preparation course through SFU Continuing Studies, and were personally know to the founders. E-mail broadcasts to these individuals generated the 136 professional development seminar applications from other sources shown for Cohort 1 on Figure 4. This made Cohort 1 the largest single intake of new applications in the history of the Society.

In subsequent years 2002 through 2015, the intakes from other sources were acquired purely through word of mouth. New registrants were added to the e-mail list at their requests, often after attending a PD seminar at the suggestions of their colleagues. Referrals from other PMPs generated another 2,129 applications over 14 years. However, as shown on Figure 4, the annual intake from other sources never again achieved even half the 2001 intake, and displayed a consistent downward trend over the years, reaching a low of 24 new applications in 2015. It is not encouraging to note that for the one seminar held so far in 2016, only three new applications were received.

An analysis was made to see if there was any linkage between the number of new applications from other sources 2002 – 2015 and the total applications received, either in the preceding or current year. It could be hypothesised that new applications would be reflective of the general level of interest in attending seminars in the community, but no correlation was found, either with total registrations or registrations per seminar. From a statistical analysis, it was found that the best fit to the historical data was a linear time series for average registrations per seminar by year. Over the 14 year period the straight line decline was  $-0.284$  registrations per seminar per year, with an  $R^2$  of 0.35 for the correlation.

## **OTHER FACTORS – ONE-TIME SHIFTS**

As noted above in the discussion of the pattern of total seminar registrations as shown in Figure 1, in specific years there were dramatic departures from the observed trends. Some possible explanations for these anomalies are discussed below.

More registration applications were received on average than could be accommodated within the nominal 50 registrant maximum per seminar in each of the years from 2003 through 2012. The number of applications that had to be turned away reached a maximum in the years 2004, 2005, and 2007. In the latter two years roughly 220 and 275 applications respectively could not be accommodated. In the year subsequent to each of the two peak years for wait listing applicants, there was a pronounced decline in the total number of applications received. This may be evidence of a chilling effect. Prospective applicants may have been discouraged by their frustrating experience in the preceding year, and may simply have chosen not to apply.

Starting in 2005 and continuing through at least 2009, BC Hydro encouraged its project management staff to obtain the PMP designation. In-house training courses for PMP exam preparation were conducted during this period, and many of those who obtained the designation subsequently applied for registration at Society seminars. This may explain in part the overwhelming number of applications received in 2005 and 2007. In 2008, BC Hydro initiated its own program for professional development in-house. Organized noon hour presentations by PMPs were a key part of this program. This may be part of the explanation for what appears to be a one-time stepwise drop in registration applications between 2008 and 2009.

The year 2012 stands out as an anomaly in all of the trends, whether for total registrations by cohort or for the entire population. There were seven PD seminars held in 2007, the greatest number ever for single year. As noted above, total applications in a year are correlated with the number of seminars offered, and the average number of applications per seminar appears to be a consistent indicator of participation for any chosen year. Notwithstanding, there was an unusually large number of applications in 2012 even after other factors are accounted for.

It was a year of turmoil in the local labour market for IS and IT personnel in 2012. This was the time that Accenture lost its contract with BC Hydro, and numerous job changes were noted among Society subscribers in this period. When people are being laid off and are searching for new positions, many of them increase their professional networking activities in the search for job leads. This may underlie the increase in applications observed for Society seminars in 2012.

All of these explanations are speculative. Further investigation would be needed to determine if there is evidence to support these conjectures.

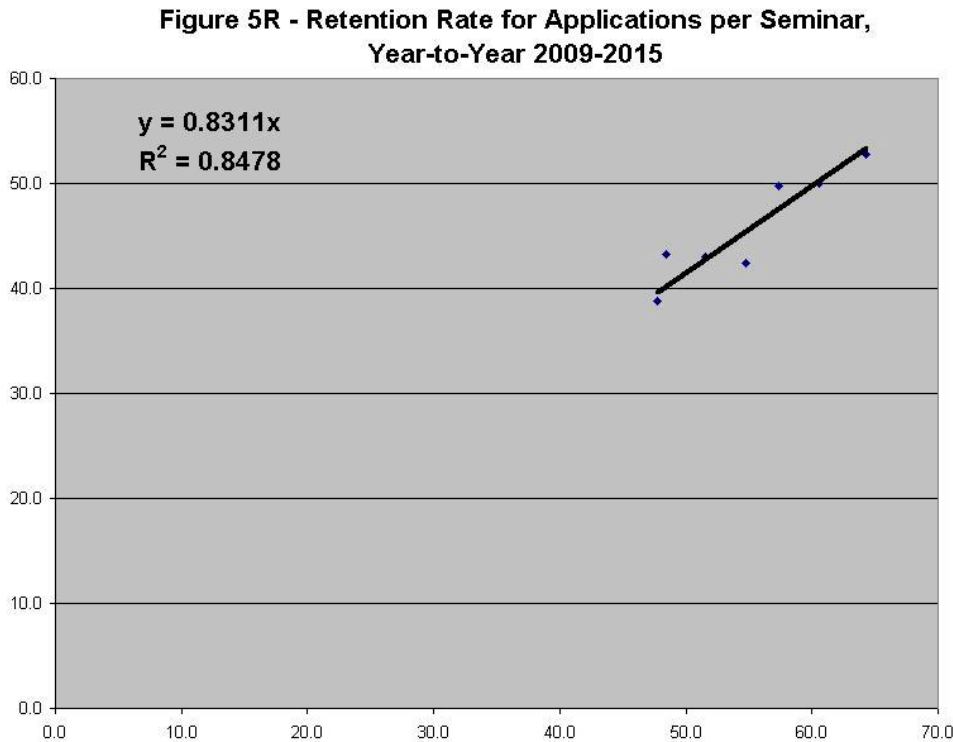
## ALTERNATIVE SCENARIOS – FORECASTS AND TARGETS

Given the explanations set out above for the observed declines in registration applications, what are the expectations for registrations at future seminars?

To answer this question, forecasts were made for future years under three scenarios, assuming four seminars per year in each case:

1. No change in the recruitment of new applications, follow the current trend of roughly 1.2 fewer new applications per year.
2. The recruitment of new applications at the rate needed to sustain the 2015 level of activity into to the future, which turned out to be 37 per year.
3. The recruitment of new applications at the rate of 55 per year, an approximate doubling of the average for the last three years

The linear trend equation for forecasting new applications from other sources has been described in an earlier section of this analysis.



To forecast the number of applications attributable to the surviving population of earlier cohorts, it was hypothesised that the number of applications per seminar in a year coming from earlier cohorts (returning applications) would remain a constant proportion (retention rate) of the total applications per seminar received in the preceding year. This is consistent with the expectation that the same rate of decline in numbers will be experienced in each of the cohorts that make up the total population. An analysis of retention rate by cohort showed this to be true with a remarkable consistency for the first eight cohorts – groups for which sample sizes were sufficient to support confident inferences.

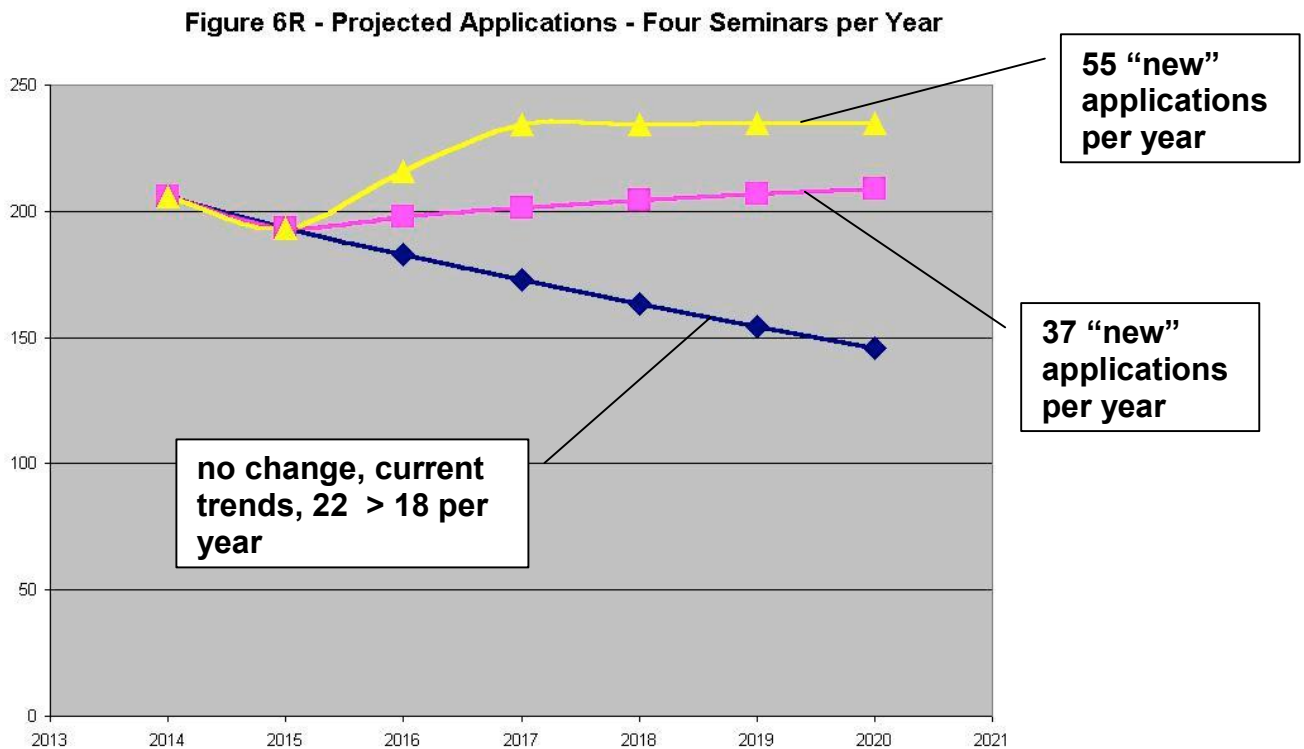
Historical data for total applications and returning applications, all per seminar per year, were assembled and analysed. Two scenarios were examined:

1. The full 14 years of returning applicants
2. Only the last seven years of returning applicants. In the preceding section of this report, the wild swings in applications from year to year, the possible chilling effects of dramatic over-subscriptions, and a one-time step decline between 2008 and 2009 were noted. For the period from 2009 onwards year to year variations are relatively moderate.

For the full 14 year period, the trend line for the data was a reasonable fit, but showed a lot of scatter, with  $R^2 = 0.5907$  for the correlation, and an average retention rate of 0.7663, which was used for the forecasts in the April 3, 2016 edition of this report. For the period 2009-2015, however, the trend line is a much better fit to the data. As can be seen from Figure 5R, the  $R^2$  value was a very high 0.8478 and the retention rate is 0.8311. This means that the survivors of a population of applicants will generate roughly 17% fewer applications in a year than did that population in the preceding year. In the absence of new intakes, registration applications will decline by 17% per year for the same number of seminars in each year.

For the first eight cohorts, the calculated retention rates ranged from 0.805 to 0.858, with a mean of 0.835. Corresponding  $R^2$  values ranged from 0.78 to 0.97. The striking consistency of these results warrants a high level of confidence in the use of 0.8311 as the retention rate for making forecasts for the whole population.

Figure 6R shows the projected total registrations over the next five years for the three scenarios.



With no change in the recruitment of new applications, it is forecast that within three years, average applications for registration will be around 40 per seminar before cancellations. This may be an optimistic projection, since it envisions 22 applications from new subscribers in 2016. So far there are only three such applications.

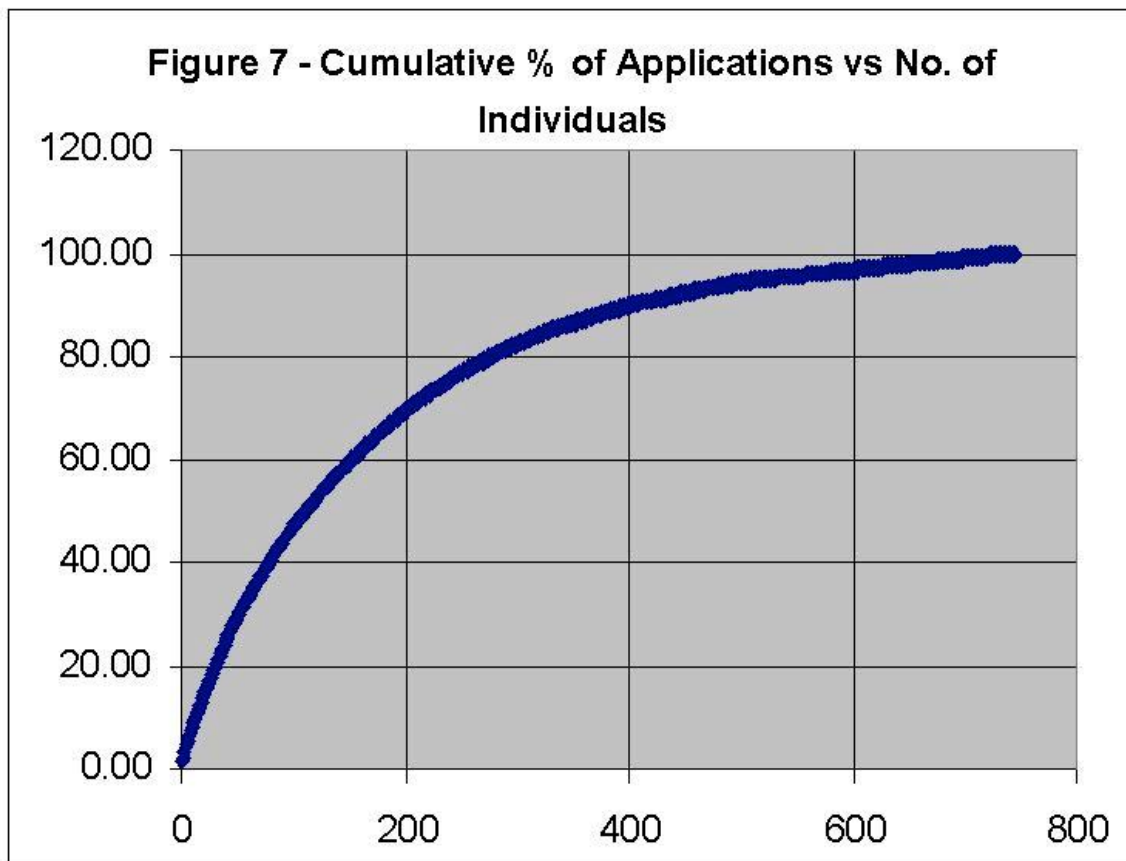
To maintain the level of attendance experienced in 2015, about 37 applications would be required from new subscribers each year.

If recruitment is increased to yield 55 applications from new subscribers per year, the total number of applications will rise until an equilibrium is reached at 235 applications per year, or 58 per seminar before cancellations.

All of these projections of course assume that it will be possible to recruit presenters and workshop leaders to fill a program of four seminars each year.

There are plans for discussions with the West Coast BC PMI Chapter with the aim of getting the assistance of the Chapter to publicize the professional development seminars to all of the PMPs in the lower mainland. There are likely in the order of 2000 PMPs on the Chapter distribution list. In order to sustain the required number of applications for PD seminars in the future, there would have to be a continuing arrangement for publicity rather than a one-time announcement.

#### **PARETO ANALYSIS – LOYAL, CASUAL, AND UNINTERESTED SUBSCRIBERS**



The 745 individual names in the data base were sorted in descending order by the number of times that they applied for registration in a PD seminar. The cumulative number of applications was calculated in the same order, and expressed as a percentage of the total 4430 applications in the data base. This information was then used to construct the cumulative frequency diagram in Figure 7. This is one way of presenting a Pareto diagram which allows a determination of which portion of a population makes the greatest contribution to the total.

As can be seen from Figure 7, 50% of the applications came from 112 individuals, or 15% of the population. It is instructive to divide the population of applicants into thirds. The most active third generated 76% of the applications, the next third generated a further 18%, while the least active group, the final third, accounted for less than 6% of the application.

It has been noted above that another 5% of the applications for registration are missing from the data base. From the Pareto analysis, we can estimate that the majority of the missing records will be for individuals who fall into the first third. The effect then, is to understate the number of applications for this most active group.

The most active third can be thought of as loyal subscribers. Members of this group have applied at least six times or more, with an average of 13.4 applications. The attachment to this report contains a listing of the 105 most active individuals in the data base, those who have made more than 12 applications in the 15 years. Even within this group of loyal subscribers, however, the demographic imperative of population decline applies. Many have dropped out over the years. Only 68, barely two-thirds, have applied to attend a seminar in the last three years.

The individuals in the next third have applied from 2 to 5 times, with an average of 3.1 applications. It is fair to class this group as casual subscribers. These individuals have applied for reasons more than simple curiosity and know what benefit attendance may provide. If there were to be a campaign to attract more participation from existing subscribers, this group would be a logical target.

Finally, the third with the least participation has applied only once. Many of the people in this group are presenters who attended only for the day of their appearance in a seminar program. Except for a small number of persons who have perhaps applied for the first time in the last two years or so, this group can be considered uninterested, and should not be the target of any promotional activities.

The Pareto analysis will be essential for selecting samples for collecting information on preferences and behavioural intentions, by survey questionnaires or other means. Meaningful conclusions can best be drawn from comparisons. In this case, if we want to know how to attract additional participation from existing subscribers, a comparison should be made between the responses from casual subscribers and those from loyal subscribers when looking for the root causes of differences in behaviour.

## ATTACHMENT: LISTING OF 105 MOST ACTIVE APPLICANTS

Those who have NOT applied for registration in the period 2013 – 2015 are **highlighted**.

<b>Last</b>	<b>First</b>	<b>Frequency</b>
Wawruck	Walter	61
Smith	Duncan	44
Cayuela	Alberto	37
Turner	Gregg	37
Brook	Judith	35
Hambury	Joan	33
Hanna	Roger	31
Cooke	John	30
Wood	Duncan	29
Hanson	Margaret	28
Sandall	Glynis	28
Baum	Dan	27
Mehjoo	Ahmad	27
Stefan	George	27
Hunter	Kim	26
Marshall	Jim	26
Payeur	Mary Jean	26
Ross	Neal	26
Shenouda	Sammy	26
Sinclair	Bill	26
<b>Sorokin</b>	<b>Milt</b>	<b>26</b>
<b>Walker</b>	<b>Sandra</b>	<b>26</b>
Waywood Cox	Judy	26
Wolf Pany	Marko	26
Chan	Gary	25
Patten	Maria	25
Schulz	Robert	25
van Dommelen	Sylvia	25
Dhahan	Novider	24
McConachy	Brian	24
Nielson	Richard	24
Quaife	Chris	24
<b>Baker</b>	<b>Ron</b>	<b>23</b>
Shaw	Stan	23
Cohen	Vlad	22
<b>Friesen</b>	<b>Vic</b>	<b>22</b>
Giacomin	Wonita	22
<b>Hawley</b>	<b>Dale</b>	<b>22</b>
<b>Herald</b>	<b>Dora</b>	<b>22</b>
Wise	Mark	22
Brady	Paul	21
Tucker	Jim	21
<b>Holleran-Boswell</b>	<b>Denise</b>	<b>20</b>
Lakey	Tracey	20
Smithe	Michelyn	20
Jessa	Adil	19
Kersey	Al	19

Lepiane	Peter	19
Murphy	Gary	19
Brien	Carol	18
Cerniuk	Stacey	18
Daly	Ellyn	18
Dy	Eugene	18
Ebert	Luba	18
Hewson	Jocelyn	18
Hope-Ross	Darlene	18
Johnson	Blake	18
Beggs	John	17
Bryant	Nick	17
Flegel	Linda	17
Guest	Lucy	17
MacKenzie	Jennifer	17
Morin	Marianne	17
Nothof	Helsa	17
Preston	Valerie	17
Ryan	Greg	17
Wager	Daren	17
Molina	Robert	16
Morena	Gino	16
Mullholland	Peter	16
Parent	Ray	16
Pepin	Ken	16
Poulin	Christine	16
Sekhon	Satnam	16
Virk	Balvir	16
Amershi	Hafeez	15
Burke	Adrian	15
Forrest	Stephen	15
Lee	Julie	15
McLean	Carol	15
Robbins	Dave	15
Stuart	Coleen	15
Waldock	Tom	15
Danielson	Dave	14
Fraser	Don	14
Harrison	Julie	14
Kropp	Darryl	14
Lee	Teresa	14
McNeill	Jill	14
Rao	Rajan	14
Read	Susan	14
Schwartz	Ann	14
Shum	Dan	14
Ambrosio	Sam	13
Chalmers	Donn	13
Dittrich	Daniel	13
Godfrey	Ken	13
Iredale	Richard	13
Kroeker	Ron	13
Marshall	Teresa	13

Mogan	Susan	13
Papile	Sandro	13
Phillips	James	13
Redwood	Doug	13
Virani	Azimina	13