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A Similarities and Differences in Statistical Programming among CRO and Pharmaceutical Industries

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ABSTRACT

Statistical programming in the clinical environment has a wide range of opportunities across a breadth of exposure of the entire clinical drug development cycle. Whether you are employed by a Contract Research Organization, Pharmaceutical or Biotechnology company, or as a contractor, the programming tasks are often quite similar, and at times the work cannot be differentiated by your employer. However, the higher level strategies and the direction any organization takes as an enterprise can be an important factor in the fulfillment of a statistical programmer's career. This paper will share the author's experiences in both industries and provide insight to statistical programmers in the evolution of their career.

DEFINITIONS

The International Conference of Harmonization (ICH) that provides an international quality standard of Good Clinical Practice (GCP) states that a Contract Research Organization (CRO) is a person or an organization (commercial, academic, or other) contracted by the sponsor to perform one or more of a sponsor's trial-related duties and functions.[1] A sponsor is an individual, company, institution, or organization which takes responsibility for the initiation, management, and/or financing of a clinical trial.[2] The sponsor is responsible for implementing and maintaining quality assurance and quality control systems with written SOPs to ensure that trials are conducted and data are generated, documented (recorded), and reported in compliance with the protocol, GCP, and the applicable regulatory requirement(s).[3]

A sponsor may transfer any or all of the sponsor's trial-related duties and functions to a CRO, but the ultimate responsibility for the quality and integrity of the trial data always resides with the sponsor. The CRO should implement quality assurance and quality control. [3]

There are three things in life that are certain about today. Clinical drug development still continues, a sponsor's outsourcing of work does too, and statistical programming is a significant part of the entire drug development chain.

RELATIONSHIP BETWEEN SPONSOR AND CRO, AND ITS DIFFERENCES

Relationships between sponsor and CROs have existed for quite some time and they continue to evolve. Sponsor companies will rely on CROs when in need, whether it be a growing pipeline, strategic cost effectiveness initiative, or niche service that the sponsor company may not have. CROs rely on sponsor companies to provide services for a fee so that the CRO can reinvest back into itself and continue to grow and provide services for sponsor companies.

Statistical programming is a common function to be part of this relationship and it continues to evolve and grow as well. In our industry, data keeps coming at a high rate of speed with various formats and structures, and thus, there continues to be a need for statistical programmers to deliver meaningful information from that data.

There are two major differences between a sponsor and a CRO that can play an important part in a statistical programmer's skillset, specialty, and career fulfillment. But before the differences are categorized, these same differences happen to be a similarity between a sponsor and a CRO on a corporate scale.

First, both the CRO and the sponsor are a business. Among their strategic corporate and business segment objectives would be to drive growth, revenue and profit especially for publically traded organizations. The symbiotic relationship between a CRO and a sponsor does influence the outcome of the state of each business. From a statistical programmer's perspective, it is usually not the focus of our day to day tasks to remember that both a CRO and a Sponsor are businesses. Instead, our focus is our tasks assigned and deliver first time right and on time delivery. A prominent difference that a statistical programmer can face between a sponsor and CRO is the knowledge of the finances of their organization. A programmer in the CRO *is* the revenue for the company. Whereas a sponsor programmer *is not* the revenue; it is the writing and filling of prescriptions that is the revenue for a sponsor. A CRO or sponsor programmer can face various levels of financial pressure as well as career benefit of financial knowledge as a gained skillset.

The second similarity from a business entity level is simple and straightforward; the same work is performed regardless of it being done by the sponsor or CRO. Take a look at the fundamentals of our ICH GCP that we all abide by. It specifically states that all references to a sponsor in that guideline also apply to a CRO to the extent that a CRO has assumed the trial related duties and functions of a sponsor [4]. This implies that both organizations' tasks are not differentiated in the guidelines. The work that statistical programmers perform is the same in a clinical trial. However, when the sponsor does choose to delegate some of the responsibilities to a CRO, it can play a big difference on the role of a statistical programmer.

Furthermore, the type of resourcing model the sponsor and CRO engage in can provide an opportunity of variety of work a programmer can experience in their career. The author acknowledges that there are multiple types of resourcing models that have been developed over the past 20 years. In this paper, the focus will be contained and generalized into the two following resourcing categories, regardless of it being FTE-based, deliverable based, or a hybrid of the two: When the CRO performs service in the sponsor's system, and when the CRO does not perform service in the sponsor systems.

FINANCIAL INFLUENCE AND SKILLS

Of all the similarities and differences between a sponsor programmer and a CRO programmer, the author feels that the financial aspect of the work is perhaps the strongest difference. There can be advantages for a programmer to work in a CRO or sponsor. It depends on your career direction and lifestyle. The author took the liberty of determining where it is advantageous on each topic below and it is his opinion and not necessarily that of others.

FINANCIAL AWARENESS

A CRO programmer does need to remain utilized. It is the business of a CRO. The CRO programmer is usually very aware of their weekly utilization. For example, in a 40 hour work week, and if the programmer's utilization target is 95%, then they must put in at least 38 billable hours for that work week. That only give the programmer 2 hours to conduct other mandatory non-billable tasks, such as training and administrative needs. It is a good practice for managers of those programmers to monitor utilization routinely. If the utilization targets are not met, then the programmer and manager need to explain why this is the case, adjust, and report this upward. Each CRO is different where the utilization factors can vary, but in most cases, understanding the billable time and targets is an added pressure to the CRO programmer. It is common for a CRO programmer to 'make up' their billable hours the next day, so that on the average, the weekly utilization target can be met. And if the weekly target is not met, then the monthly target is a goal... And so on. There is an added sense of pressure for the CRO programmer to keep their billable hours accounted for. And if the communication between manager and programmer is not well kept, then the discussion around utilization targets can be sensitive in nature to the programmer.

When compared to a sponsor programmer, they are not the revenue and many times their resource time value is not represented as utilization. A sponsor programmer is there to add value to the organization, not revenue. It is common for sponsor programmer to have a time entry system. And instead of ongoing and frequent look at the utilization, the proportion and volume of time is generally looked at on the project level, as opposed to the task and activity level of a CRO programmer. The time value of a sponsor programmer is generally looked at on a monthly basis and sometimes quarterly, and on occasion, not at all for periods of time. Although their time entry is expected to be accurate, there is much less pressure on the sponsor programmer to be aware of their billable hours. Case in point: a sponsor programmer is not billable.

Advantage: Sponsor programmer. Less focus on each hour worked.

FINANCIAL FORECASTING

Both sponsors and CROs must have effective financial forecasting in order to run a good business. A sponsor programmer will generally relate to the resources as FTEs (Full Time Equivalent). For example, an FTE of 1.5 relates to 1 programmer full time and another programmer 50% of the time. Or equivalently, 3 programmers 50% of the time. An FTE can be 'loaded' or 'unloaded'. Loaded means that it includes all the time associated with non-project work: time off, training time, volunteer time, etc. A Sponsor programmer generally does not perform the forecasting, it is the manager. However, when the programmer has a career path to move into a management role, then it is a good opportunity to learn under their management on how and when the forecasting is performed at their project level and how it is rolled up into their business segment.

A CRO will take the forecasting to the next level. They too can represent their resources as loaded or unloaded FTEs. However, due to the nature of the CRO and unlike the sponsor, those FTEs are synonymous with revenue. A sponsor will roll up their FTEs to understand the cost of doing the business, but the CRO rolls up their FTEs and directly relates that to the revenue those FTEs generated. The comparison of the cost of doing the business with the revenue that costs brings in is commonly referred to the margin or realization. The revenue and margins are grouped and calculated accordingly among groups and reported into higher management. The results are generally shared with all the employees. A CRO programmer is directly involved in the financial forecasting by providing their time

spent against the projects that delivered revenue. The frequency of this routine is often monthly. Even mid-month forecasting is often done. When a CRO programmer's career path is management, there is a much higher level of awareness, effort, and financial skills required when compared to a sponsor programmer. The skillset of financial forecasting requires training. Luckily, due to the nature of the analytical skills of a programmer, the training comes much easier than that of other functions. Also, the CRO programmer needs to have a good sense of self-awareness before getting themselves into management, because finances are a big part of management, and the programmer may not necessarily enjoy that on a routine basis.

Advantage: CRO programmer. More opportunity for business skill development.

BID DEFENSES

A bid defense is when a CRO presents their case on why the sponsor should do business with the CRO. A bid defense usually starts with a request for information (RFI). This is general information about the CRO provided to the sponsor to help assess if the sponsor wants to take it to the next level. If so, then it generally turns into a request for proposal or quote (RFP or RFQ). This is detailed information on how the CRO will deliver the work and can include project timelines, staffing, and expected cost of the work, among other things. If the RFQ is favorable, then the CRO can be known to visit the sponsor and present their defense against other competing CROs.

A CRO programmer will generally get involved in RFPs because they know most about what they actually do. It is usually the senior leadership or business development that composes the whole RFP, but the programmer can be needed to fill in the holes (technical stuff). It can be common that programmers actually write certain sections of the RFP. When doing this, they must keep their technical side as well as good writing skills that can 'sell' their work. It also gives them the opportunity to directly interact with their senior leadership across functions. If the programmer has a good set of selling skills, then they can also travel to the sponsor with the bid defense team and defend their case which can be enjoyable to a programmer. The whole process of RFI to bid defense means that the CRO can potentially gain new work. This is always a priority. This is good for the programmer because it is a non-billable activity that takes a substantial amount of time; their low utilization levels will be explained and accepted by senior leadership. A CRO programmer may also enjoy this because it can help build or maintain certain skills such as 'sales', writing, creativity and analytical approaches to non-programming problems. It also can provide an opportunity for a variety of work to the programmer. Examples include time away from their daily coding and analysis of clinical data, working with new people (potential clients) they have never met, and travel.

A sponsor programmer, usually the most senior, can be part of the bid defenses and RFI process especially if a certain skillset or niche is required by the CRO. It required to sponsor programmer to clearly articulate what is needed to their management so that the right questions can be asked. When the sponsor programmer participates in a bid defense, then they have the opportunity to see the differences between multiple CROs as well as experience additional needs from the sponsor such as computer systems quality, and privacy practices from the CROs. This can build a sponsor programmers awareness of best practices in the industry from a CRO perspective as opposed to their own system.

Advantage: CRO programmer. More opportunity for business skill development.

TRAINING AND DEVELOPMENT

It is best for the programmers in our industry to have ongoing training. There are evolving standards, changing technology, and keeping up with the industry buzz words such as data visualizations and real world analysis. If training on the job is not practical, then there must be time spent away from their project work in order to gather the latest knowledge and training. Examples can be attending this PhUSE conference, attending a 2 day workshop, or enrolling in a local or on-line university program for higher education. There are generally costs associated around taking this training. The cost of the training, travel and materials itself, and the cost of not using that time to complete project work. The sponsor will generally be more generous with training and development over the CRO, because the CRO is not realizing revenue when the CRO programmer is away. This sort of training is usually part of the sponsor programmer's development. As an example, a sponsor programmer would be able to attend 1 conference per year as part of their development. For the CRO however, only the senior programmers attend conferences and they must be a presenter, on the conference committee, or have some conference function. CRO also assess and use the trainings and the global certifications completed successfully by their employees as a selling point to the sponsors. This enhances the work credibility to be performed by the CRO.

Advantage: Sponsor programmer. Less restrictions of Training.

PAY AND BENEFITS

Organizations usually provide their employees more than just a paycheck. They provide additional financial benefits as well, such as contributions to health insurance coverage, paid time off, and annual contingent cash bonuses, etc.

This is usually referred to direct cost. When an organization calculates the cost of the programmer to the company, they add in the total direct cost: salary plus benefits. The non-salary benefits factor does vary by geography. The organizations must also pay for indirect costs. These include the costs such as IT infrastructure, building leases, corporate tax, and paying for administrative overhead.

Each organization has their own strategy of attracting and retaining talent. An organization can be cash focused and rely on contingent compensation based on the annual success of the company, or heavily weigh in on the non-monetary benefits, or a combination of both. It is a matter of preference and lifestyle of the programmer that can determine their employment. The clinical drug development remains strong and thus competitive. A CRO does not want to lose their programming talent to other CROs or sponsors, and vice versa for a sponsor.

Advantage: Both. Industry remains competitive and commensurate.

JOB SECURITY AND OUTLOOK

Regardless of a sponsor and CRO, we all know there is no guarantee of our jobs forever. Most organizations have the faith and trust system. When payday comes on Friday, there is no guarantee that the company will continue to pay the employee on Monday. Likewise, there is no guarantee that the employee must return to work on Monday and continue employment. There of course are exceptions such as being on a signed contract or in a geography that has a mandatory notice periods. The companies that have a long history or strong heritage tend to provide the best severance packages. Remember that a CRO is a business. If a programmer becomes non-billable, that is, recovering the cost to their company, there is a risk of being released from that organization. A CRO must maintain the revenue balance in order to sustain itself. As already discussed, the sponsor too is a business. If there is a strategic shift in their business to outsource more programming work, say, to a lower cost region, then the sponsor programmer may be released from their assignments and have to seek other job opportunities.

It really depends on the individual corporate strategies of a sponsor company to choose to outsource or not. The sponsor companies can shift their sourcing strategies. For example, if they cannot or do not want to build resources in-house, then they can resort to a CRO. A CRO is always look for the next opportunity or placing effort for repeat business in order to sustain itself. Either way, not company wants to terminate good talent. They all want to keep a good relationship with their employees. But in the business world (business development - which is why they are always selling), it is their job continuity.

Must remain nimble, and understand that it is business, and work on having a strong network of peers in your industry. Luckily, our jobs are relatively plentiful in both sponsor and CRO organizations. It can be somewhat easy to get another job as long as you are good and in the right location. The skillsets that are in demand are not just good coding skills, but also a good set of soft skills and character.

Advantage: Both. Programming roles continue to be needed.

SOURCING MODEL INFLUENCE

When it comes to a statistical programmer's perspective on the similarities and differences when working in the CRO or sponsor, a good analogy can be as follows. Their perspective can be viewed as a spider web. A sponsor programmer sitting in the middle of the web would see an outward-in perspective. The sponsor programmer has the potential to see many CROs and pull them in and do it the sponsor's way. Conversely, a CRO programmer sitting in the middle of the web will have an inward-out perspective. The CRO programmer has the potential to see many sponsors and spread themselves outward and experience many ways of doing the work. Many times when the CRO is in the sponsor systems, they will be dedicated to that sponsor until the project is over or they are ready to move on to other opportunities. When the CRO does work in their own system, they can work on multiple projects from different sponsors at the same time.

CRO IN THE SPONSOR SYSTEMS

This is a situation where the CRO programmer can feel like an 'extension' to the sponsor company. When working in the sponsor systems, a CRO programmer is generally integrated with the sponsor's people, processes, and technology. The benefits of a CRO programmer in this case, is that they truly get to experience that spider web analogy mentioned above. Although there is usually longevity for the programmer to stay in this model, the CRO programmer will not be working at that sponsor forever. If they discover that they prefer to work in the sponsor's system, then they will most likely request from their management to get the opportunity of variety of another sponsor in their next assignment.

The CRO programmer is usually not in a leadership position when in the sponsor systems. They are generally there for developing code and turning the clinical crank. Programmers can get burnt out when coding '100 kph' all the

time. When in the sponsors systems, and when integrated within their culture, the programmer can have perks associated with this model. Example include having lunch if on-site with the teams they work for, or partaking in the sponsor company holidays such as year-end shut down.

Benefit of a sponsor programmer, is that there is generally more stability of CRO resources. The CRO will tend to put the most talented and devoted programmers when working in the sponsor systems in order to demonstrate quality and performance. The sponsor programmer also gets to take on more leadership opportunities by directing tasks of the CRO programmer as if it were their own programmer. Leading and directing others requires a special set of skills and motivation in order to successfully do so. Some programmers may appreciate this and some may not prefer it. There is more to leadership than coordinating tasks and overseeing the work. There is listening and responding. The sponsor programmer should capitalize on the fact that the CRO programmer in this case usually comes with diverse and deep experience from other sponsor and CRO companies. That CRO programmer may see things within the sponsor environment that could be done better. It is usually the sponsor programmer that can influence change within their organization and not the CRO programmer. This places the sponsor programmer in a good opportunity to demonstrate leading and getting work done through others. These are good attributes to develop and demonstrate if the programmer is wanting to get into higher leadership opportunities.

Sponsor programmer has more control over how the work is done. In this model the sponsor programmer is generally more hands-on and gets to have a close look at what and when the CRO programmer is doing. This results in a feeling of more control over the work which can be a preference. This can be comforting to the sponsor programmer. Also, if the CRO programmer is not performing up to par, then it is generally easier to correct the behavior of the CRO programmer because the CRO programmer is trained by their management to always please the sponsor regardless of what it takes. There can be more pressure for the CRO programmer to perform when in the sponsors systems.

A disadvantage of a CRO programmer is that there can be ‘double training’. When employed by the CRO, they still need to abide by the CROs policies and procedures. An example is the CRO should require annual ICH GCP training. And when you are an extension of the sponsor, the CRO programmer would most likely be required to take the sponsor’s annual ICH GCP training when they abide by the sponsor’s operating procedures and policies it is good to be trained with this example, but the CRO programmer can experience unneeded redundancy.

Understanding how to navigate through the sponsors systems can be exciting to the CRO programmer. They have the opportunity to experience new processes and programming systems that they may not have experienced before. But they are limited to the sponsor’s procedures and may have less freedom to code when compared to being in the own CRO system. Also if the CRO programmer uses the CRO equipment and remotely logs into the sponsor systems, then the CRO could get frustrated when trying to figure out which IT to go to for support. There is nothing is more frustrating than IT down time especially when you have a good idea or technique you are ready to attempt but you cannot because of downtime.

The overall advantage of a CRO programmer working in the sponsor’s systems is that they get to test their learning agility and performance because they are pressured to demonstrate their professionalism and represent their company well. The CRO leadership would not just put anyone in that situation unless they know the competency of the programmer. Also, if the CRO programmer has never work in a sponsor company, then they can get a feel of the cultural differences from that of working in the CRO only.

The advantage of the sponsor programmer is they generally get the retention of the CRO resources. It requires time and cost to get the CRO programmer fully utilized. Thus the working model is generally long term. Moreover, the CRO management will generally place the highest talent in the sponsor systems in order to demonstrate the best and continue to the longevity.

CRO NOT IN THE SPONSOR SYSTEMS

In this model, the CRO programmer does work in their own systems, uses their own equipment and operating procedures, and works with their own people. It has been referred to work being ‘thrown over the fence’. And when the CRO completes the tasks, then it is thrown back over. A CRO programmer has the opportunity to experience the highest variety of sponsors simultaneously. There can be an additional scenario where CRO programmer working in CRO environment has to acknowledge and abide by both CRO and sponsor legacy SOPs, templates, or practices.

It is very rare when the sponsor programmer can get access into the CRO systems and see what and how the programming work is being conducted. They are generally closed to the CRO’s system. This can put the sponsor programmer’s trusting skills to the test. It is natural to want to double program or check everything that comes back in-house. However there should be a degree of confidence and perhaps only perform plausibility and completeness checks. This can be fulfilling to some programmers but not to others.

The CRO programmer has the flexibility and freedom to code when in their own systems. This can perhaps build a creative skillset in the programmer. It is easier for the programmer to influence their own people, culture, and ways of doing things. Moreover, the author has experienced that the CRO programmer can be less cordial since they may not be in direct contact with the sponsor. This is good for the shy programmer because they will most likely push back or initiate improvements to their own people as opposed to working in the sponsor's systems.

A CRO programmer can have a more flexible work schedule when working in their own systems. They do not have to abide by the sponsors working hours. It can be arranged that with your local team and manager to claim working hours that best fit their lifestyle. This is important to the home work life balance because overtime can be more prevalent when not in the sponsor's systems.

INDEPENDENT CONTRACTOR

If you are an independent contractor that is not affiliated with any organization in terms of employment (except yourself), then you are by definition of industry guidelines a CRO. The resourcing model can still apply to either doing work in the sponsor systems (the most popular) or doing the work outside the sponsor systems. Financial knowledge is at high importance because you must account for every hour billed. Also there is no company benefits such as vacation, pension, sick time; it is all self-pay. An independent contractor needs to tend to administrative tasks in order to maintain their own self-company. Also, the contractor can do work for both a CRO and a sponsor which could perhaps provide the widest variety in their work. The contract can be relatively short term and thus the contractor will spend more effort in planning and job searching looking for their next gig. Although the pay tends to be the highest for this role, the self-overhead may not be suited for just any programmer. This is generally best suited for those individuals who are very good programmers and are not good employees. Here, they do not have to deal with corporate rules such as travel expense policies and sick time.

CONCLUSION

The life as a clinical statistical programmer offers a variety of work depending on whether you are self-employed or by a CRO or sponsor. Depending on your individual preferences and character, there is an opportunity of different focuses of work such as being a head-down programmer or one that has a large umbrella of responsibilities as a leader. As long as the clinical drug development cycle continues, there will be a strong job outlook for a programmer where the variety can play an influence on their career. As programmer maps out their career plan, a consideration would be to understand the similarities and differences between the two environments, understand what fulfills you, and capitalize on the various opportunities that are offered in our industry.

REFERENCES

[1] http://www.ich.org E6 (R1) 1.20
[2] http://www.ich.org E6 (R1) 1.53
[3] http://www.ich.org E6 (R1) 5.1.1, 5.2.1
[4] http://www.ich.org E6 (R1) 5.2.4

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RECOMMENDED READING

Guo, Y., Matthews, M. - "Advantages and Disadvantages of Two Commonly Used CRO Resourcing Models in the Pharmaceutical SAS Programming Environment" http://www.pharmasug.org/proceedings/2015/MS/PharmaSUG-2015-MS06.pdf

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