

Decode Your Future: A Professional Development Growth Map for Programmers and Statisticians by Role Type

Diana Stuart, Veramed, London, UK

ABSTRACT

Job titles often suggest seniority or experience but rarely reflect the diversity of responsibilities and development needs within a role. From technical experts to project leads, programmers and statisticians span a wide spectrum of strengths and priorities. This poster and accompanying paper introduce a practical guide that breaks down common role types within these job families, mapping them to key skills, development focus areas, and growth pathways. Whether you are an early-career professional, a technical specialist, or transitioning into leadership, this guide helps identify where you are and what to focus on next. By offering a clear structure for professional development aligned to role type, it empowers individuals to take ownership of their learning journey and supports managers in tailoring development conversations. A must-have resource for anyone seeking clarity, direction, or inspiration in navigating their career in statistical and programming roles.

INTRODUCTION

In the world of clinical data science, roles are not dependent on continuous professional development such as those within other regulated environments, for example those in teaching or medicine. Nonetheless continuous professional development (CPD) is an important undertaking for us all so that we reap its benefits. It allows us to:

- Keeps Skills Current – data science and pharma evolve with differing rapidity (new tools, technologies, and methodologies emerge all the time). CPD ensures you stay up to date and maintain professional competence.
- Supports Career Growth - Whether you're aiming for a promotion, a role change, or deeper expertise, CPD helps you build the skills and experience needed to progress confidently.
- Enhances Job Satisfaction - Learning new things and improving your capabilities can boost confidence, engagement, and motivation—making work more rewarding.
- Builds Professional Credibility - Ongoing development demonstrates commitment to your field, which can strengthen your reputation and open doors to new opportunities.
- Encourages Self-Reflection - CPD invites you to assess your strengths, identify gaps, and set meaningful goals—helping you take ownership of your learning journey.
- Enables Adaptability - In a changing world, those who learn continuously are better equipped to handle transitions, solve problems creatively, and lead effectively.

The purpose of this paper is not to pigeonhole programmers and statisticians, but to provide a starting point suited to your personality, goals and strengths as you approach a professional development conversation. It's aimed to be a valuable resource for those seeking clarity and direction, and for leaders aiming to support tailored development conversations.

A POINT OF CLARIFICATION

This paper often refers to “clients” and for CROs, who these are is clear. Service providers often are required to perform oversight and lead roles on behalf of their clients as well as be a traditional outsourced study team with a nominated main point of contact for the client, hence the focus on client management skills. However, whether you work for a service provider, biotech or pharmaceutical company, we all have interactions with people external to our direct teams who may also be internal or external to our organisations. All of these could arguably be referred to as customers and hopefully the equivalence is clear. Irrespective of our level we should develop essential people skills that enable us to communicate effectively and collaborate with people external to our direct team.

STATISTICIANS

DELIVERY STATISTICIAN

A delivery statistician will work on a range of clinical studies. Their responsibilities include:

- Preparing and reviewing study documentation including protocols, analysis plans, output (table, figures and listing) shells and analysis dataset specifications.
- Input into choice of appropriate statistical methodology.
- Manipulating, summarising and analysing clinical trial data using a variety of statistical techniques.
- Programming and validation of statistical outputs.
- Mentoring of less experienced members of the team.
- Participation in internal and client meetings.

A delivery statistician's daily interactions may typically include:

- Building an effective collaborative relationship with clients/wider team members, managing their expectations, whilst being the primary point of contact. Be their go-to person to provide stats consultancy advice.
- Leading your team to deliver on time, to budget and with high quality work.
- Liaising with internal management to define scope of work and support proposal development.
- Providing support and mentoring for less experienced statisticians on the team.

Career Pathways

- Short-Term (6–12 months): Strengthen technical delivery and client relationship skills. Begin mentoring less experienced statisticians and contributing to internal process improvements.
- Long-Term (1–3 years): Progress to Lead Statistician. Present at industry conferences and contribute to innovative study design or process optimization.

Core Competency Areas

- Technical Excellence: Deepen expertise in statistical methodologies and clinical trial design. Enhance programming skills in SAS and R.
- Project Delivery & Quality: Deliver high-quality statistical outputs on time and within budget.
- Communication & Collaboration: Become the go-to statistical consultant for clients or within the wider organisation.
- Leadership & Mentoring: Support and mentor less experienced statisticians.
- Strategic & Innovative Thinking: Contribute to process improvements and innovation.

Example Developmental Goals

- Development to Lead Statistician.
- Gaining experience across a range of therapeutic areas and/or phases.
- Presenting at conferences.
- Developing and executing innovative study design and/or efficiency optimisation ideas.
- Peer mentoring and/or line management.
- Authoring/presenting internal training.

Example Success Measures

- Positive feedback from clients and peers.
- Promotion to Lead Statistician or equivalent role.
- Successful delivery of at least two studies as primary statistician.
- Presentation at one external conference or internal symposium.

TECHNICAL STATISTICIAN

If you have an appetite for innovation, a deep understanding of statistical methods, and a flair for identifying appropriate methodology then this Statistician type just might be you. Their responsibilities include:

- Providing statistical consultancy to clients and colleagues, understanding research questions, identifying appropriate methodology, and advising on implementation.
- Developing and deploying novel and computationally challenging statistical analyses for ongoing studies in collaboration with project lead statisticians and programmers.
- Developing expertise within the organisation; equipping others to identify, understand and implement advanced statistical methods through training, mentoring and contributions to knowledge bases & code repositories.
- Understanding the regulatory requirements related to design and analysis of studies.
- Participating in protocol summary development. Giving input into study design, efficacy and safety parameters and planned statistical analyses. Performing sample size calculations and study design simulations.

- Participating in protocol development, review and approval.
- Author/review Statistical Analysis Plans (SAPs).
- Perform exploratory analyses.
- Review clinical study reports and provide input on interpretation of results.
- Review and input into regulatory documents and interactions.
- Act as the lead statistician on behalf of the client for one or more clinical studies within a clinical program or across multiple clinical programs.
- Author, contribute to, oversee and review abstracts posters, presentations, and manuscripts for publication.
- Ensure accuracy of all biostatistical aspects of such documents.
- Support and mentor more less experienced statisticians on the team.

Career Pathways

- Short-Term (6–12 months): Deepen expertise in advanced statistical methodologies and regulatory frameworks.
- Long-Term (1–3 years): Become a recognised internal expert in a specialist statistical area.

Core Competency Areas

- Advanced Methodology & Innovation: Master complex statistical techniques and their practical implementation.
- Statistical Consultancy & Communication: Provide high-quality consultancy to internal and external stakeholders.
- Knowledge Sharing & Mentoring: Build internal capability through training and mentoring.
- Regulatory & Clinical Understanding: Strengthen understanding of regulatory expectations and clinical context.
- Thought Leadership & Visibility: Build a professional profile as a technical expert.

Example Developmental Goals

- Presenting at conferences and authoring papers.
- Developing and executing innovative statistical methodologies, study design and/or efficiency optimisation ideas.
- Line management and peer mentoring.
- Contributing to business process improvements and authoring/presenting internal training.

Example Success Measures

- Recognised as a go-to expert in at least one statistical area.
- Delivered at least one internal training or mentoring engagement.
- Presented at a conference or published a paper.

PROJECT LEAD STATISTICIAN

Suitable for those keen to lead a team across a range of projects, ensuring delivery is both on-time and within budget. This role is also great for those looking to mentor less experienced Statisticians and collaborate closely with clients. Their responsibilities include:

- Authoring/reviewing prespecified analysis documentation such as Statistical Analysis Plans.
- Reviewing output specifications including standardised analysis data specifications (e.g. ADaM) & table, figure and listing specifications.
- Identifying data and standards issues and resolve or escalate as appropriate.
- Performing complex statistical analyses.
- High level review of outputs to ensure quality.

A delivery statistician's daily interactions may typically include:

- Building an effective collaborative relationship with clients and/or internal teams, managing their expectations, whilst being the primary point of contact. Become their go-to person to provide stats consultancy advice.
- Leading the team to deliver on time, to budget and with high quality work.
- Liaising with relevant management teams to define scope of work and support proposal development.
- Providing support and mentoring for more less experienced statisticians on the team.

Career Pathways

- Short-Term (6–12 months): Lead multiple studies with confidence and ensure high-quality delivery.
- Long-Term (1–3 years): Take ownership of a clinical program or portfolio.

Core Competency Areas

- Project Leadership & Delivery: Ensure timely, high-quality, and budget-conscious delivery of statistical work.
- Client Engagement & Consultancy: Build strong, trust-based relationships with clients.
- Team Leadership & Mentoring: Support the development of less experienced statisticians.
- Scientific & Technical Oversight: Maintain high scientific and technical standards across projects.
- Strategic Contribution & Visibility: Contribute to business growth and internal initiatives.

Example Developmental Goals

- Presenting at conferences.
- Line management and peer mentoring.
- Business process improvements and internal training.
- Taking ownership of a project and bringing forward new ideas and processes for implementation.
- Sharing scientific, technical and practical knowledge within the team and with colleagues.

Example Success Measures

- Successfully led multiple projects with positive client feedback.
- Mentored at least one less experienced team member.
- Contributed to a business development win or internal initiative.

PHARMACEUTICAL LEAD STATISTICIAN

Are you a natural leader and self-starter? This type of Statistician is keen to work more directly with clients, acting as an extension to their team. Lead and mentor less experienced statisticians and help contribute innovative initiatives. Their responsibilities include:

- Acting as the lead statistician on behalf of the client for one or more clinical studies within a clinical program or across multiple clinical programs.
- Understanding the regulatory requirements related to design and analysis of studies.
- Participating in the protocol summary development. Give input into the study design, efficacy and safety parameters and the planned statistical analyses.
- Performing sample size calculations and study design simulations.
- Participating in protocol development, review and approval.
- Review data management related documents.
- Authoring/reviewing pre-specified statistical analysis documents such as a SAP.
- Working closely with the lead biostatistician at the assigned CRO to oversee the statistical deliverables for the client.
- Participating in data review/evaluation meetings and other study-related meetings and activities.
- Performing exploratory analyses.
- Reviewing the clinical study report and provide input on interpretation of results.
- Reviewing and providing input into regulatory documents and interactions.
- Contributing and reviewing abstracts posters, presentations, and manuscripts for publication and ensure accuracy of all biostatistical aspects of such documents.
- Support and mentoring more less experienced statisticians on the team.

Career Pathways

- Short-Term (6–12 months): Strengthen leadership in client-facing roles and cross-functional collaboration.
- Long-Term (1–3 years): Become a trusted strategic partner to pharmaceutical clients across multiple programs.

Core Competency Areas

- Client Partnership & Strategic Leadership: Act as a seamless extension of the client's team.
- Regulatory & Clinical Expertise: Ensure statistical deliverables meet regulatory expectations.
- Oversight & Quality Assurance: Oversee CRO deliverables and ensure statistical integrity.
- Mentoring & Team Development: Support the growth of less experienced statisticians.
- Innovation & Thought Leadership: Contribute to innovative study design and operational efficiency.

Example Developmental Goals

- Presenting at conferences.
- Developing and executing innovative study design and/or efficiency optimisation ideas.
- Line management and peer mentoring.
- Contributing to business process improvements and authoring/presenting internal training.

Example Success Measures

- Positive client feedback and repeat business.
- Successful delivery of statistical leadership across multiple studies or programs.
- Mentored at least one less experienced statistician with measurable growth.
- Presented at a conference or published a scientific article.

STATISTICAL PROGRAMMERS

DELIVERY PROGRAMMER

A delivery programmer works on a range of clinical analysis and will program and QC outputs (datasets, tables, figures, listings etc) following specifications and good programming practice. Their responsibilities include:

- Developing specifications that conform to CDISC or other data standards.
- Attending and contributing to internal and client study team meetings.
- Mentoring less experienced members of the team.

A delivery programmer's daily interactions may typically include:

- Communicating directly with other study team members and client key contacts.
- Sharing updates on ongoing work internally and at client meetings.
- Collaborating with the internal team to deliver high quality work on time and to budget.
- Contributing programming expertise and wider industry knowledge as required.
- Providing support and mentoring for more inexperienced members on the team.

Career Pathways

- Short-Term (6–12 months): Lead small study teams or components of larger projects.
- Mid-Term (1–2 years): Transition into Lead Programmer role.
- Long-Term (2+ years): Explore cross-functional roles and contribute to strategic initiatives.

Core Competency Areas

- Advance programming proficiency (e.g. SAS, R, Python).
- Deepen understanding of industry data standards (e.g. CDISC: SDTM, ADaM).
- Strengthen QC and validation techniques.
- Enhance communication and presentation skills.
- Develop mentoring and leadership capabilities.

Example Developmental Goals

- Potential to develop into lead programmer or technical role.
- Gaining experience across different therapeutic areas and phases.
- Presenting internally and externally.
- Peer mentoring and/or line management.
- Developing innovative solutions to aid study reporting.
- Contributing to initiatives.

Example Success Measures

- Positive feedback from clients and internal teams.
- Timely and accurate delivery of datasets and TFLs.
- Evidence of mentoring impact.
- Contributions to process improvements or innovation.

TECHNICAL PROGRAMMER

Technical programmers are those with a flair for computing environments and programming languages or deep knowledge of technical data standards. They have an aptitude for developing technical solutions and advising team members and stakeholders, with an appetite for innovation. Their responsibilities include:

- Support the specification, development, validation, delivery and adoption of SAS & R tools and techniques following the software development lifecycle (SDLC) as applied to clinical trials.
- Provide technical expertise to support the delivery teams.
- Validation and oversight of biostatistics platforms and tools and the creation and maintenance of associated documentation.

A technical programmer's daily interactions may typically include:

- Act as the subject matter expert (SME) in the business, providing technical insight and consultancy.
- Share technical and wider industry knowledge (including clinical trial, therapeutic area and scientific context) with the client study teams and internal colleagues.

Career Pathways

- Short-Term (6–12 months): Lead internal tool development projects.
- Mid-Term (1–2 years): Present at industry conferences and author white papers.
- Long-Term (2+ years): Transition into Technical Lead or Innovation Strategist roles.

Core Competency Development

- Master SAS & R tool development using SDLC principles.
- Gain expertise in biostatistics platforms and validation.
- Deepen knowledge of data standards and compliance.
- Improve ability to translate business needs into technical solutions.

Example Developmental Goals

- Presenting at conferences.
- Contributing to business process improvements and authoring/presenting internal training.
- Providing significant contribution to internal Hackathons.
- Maximising knowledge sharing across the industry.

Example Success Measures

- Adoption and impact of developed tools.
- Recognition as SME within and outside the organization.
- Quality and compliance of validated platforms.
- Contributions to industry knowledge sharing.

LEAD PROGRAMMER

Act as Lead Programmer for one or more studies, taking responsibility for leading the programmers to ensure a successful delivery. Their responsibilities include:

- Acting as lead programmer for projects and studies.
- Contribution to project planning and maintenance of any related documents.
- Proactively managing programming resource task assignments, scope change and risks.
- Contributing to the management of the delivery of projects within time and budget.
- Managing client expectations and issue resolution

A lead programmer's daily interactions may typically include:

- Building an effective and collaborative relationship with the client.
- Leading the programming team to deliver on time, within budget, high quality work.
- Providing support and mentoring for more inexperienced programmers on the team.

Career Pathways

- Short-Term (6–12 months): Lead multiple studies and mentor less experienced programmers.
- Mid-Term (1–2 years): Transition into Portfolio Lead role.
- Long-Term (2+ years): Contribute to strategic planning and innovation initiatives.

Core Competency Development

- Strengthen team leadership and delegation skills.
- Develop project planning and resource management capabilities.
- Deepen understanding of CDISC standards and clinical trial phases.
- Improve risk management and scope control.

Example Developmental Goals

- Potential to develop into Portfolio Lead role.
- Peer mentoring and/or line management.
- Taking ownership of a study or group of studies and implementing new ideas and processes to aid delivery.

Example Success Measures

- Successful delivery of studies within scope, time, and budget.
- Positive client feedback and relationship development.
- Evidence of mentoring impact and team growth.
- Contributions to process and quality improvements.

PORTFOLIO LEAD PROGRAMMER

A Portfolio Lead may project manage one or more studies, leading a team of programmers and statisticians. May also act as Lead Programmer. Managing the budget and resource you anticipate and mitigate risks faced by your team.

Their responsibilities include:

- Acting as project lead for client projects and studies.

- Maintaining the project plan, ensuring milestones and tasks are accurately recorded.
- Proactively managing resource, scope change and risks.
- Managing the delivery of projects to budget, quality and time.
- Managing client expectations and issue resolution

A portfolio lead programmer's daily interactions may typically include:

- Building an effective collaborative relationship with the client, managing their expectations, whilst being the primary point of contact.
- Leading the team to deliver on time, to budget, high quality work.
- Supporting internal management to define scope and proposal development.
- Provide support and mentoring for more inexperienced members on the team.

Career Pathways

- Short-Term (6–12 months): Lead complex portfolios and support proposal development.
- Mid-Term (1–2 years): Transition into senior management or strategic delivery roles.
- Long-Term (2+ years): Contribute to organizational growth and innovation.

Core Competency Development

- Master resource planning, budgeting, and risk mitigation.
- Develop strategic thinking and cross-functional collaboration.
- Enhance mentoring and team development skills.
- Strengthen client relationship management.

Example Developmental Goals

- Potential to develop into management roles.
- Peer mentoring and/or line management.
- Taking ownership of a project and implementing new ideas and processes to aid delivery.
- Sharing scientific, technical and practical knowledge within the team and with colleagues.
- Opportunities to maximise business relationships across the industry.

Example Success Measures

- Portfolio delivery metrics (budget, quality, timelines).
- Client satisfaction and retention.
- Team development and succession planning.
- Strategic contributions to business growth.

CLIENT SUPPORT PROGRAMMER

Work directly for clients and gain exposure to a wide range of clinical studies while feeling valued and supported in your day-to-day work. Possible responsibilities include:

- Working directly with clients, acting as the responsible programmer for one or more studies within a clinical project(s).
- Reviewing study documents.
- Working closely with client personnel and participate in study-related meetings and activities.
- Performing an oversight role on behalf of clients.
- Reviewing and providing input into submission documentation.
- Contributing to and reviewing abstracts, posters, presentations, and manuscripts for publication.
- Supporting and mentoring more less experienced programmers on the team.

A client support programmer's daily interactions may typically include:

- Working as an extension to client teams, building effective collaborative relationships and providing an effective link between study discipline leads, including statisticians, clinicians, project managers, regulatory affairs colleagues and other programmers.
- Communicating successfully with the study team and contributing programming expertise as required.
- Sharing scientific, technical and wider domain knowledge (including clinical trial, and therapeutic area) with the client study teams and internal colleagues.

Career Pathways

- Short-Term (6–12 months): Act as lead client-facing programmer on multiple studies.
- Mid-Term (1–2 years): Transition into client liaison or strategic consulting roles.
- Long-Term (2+ years): Influence client delivery models and strategic partnerships.

Core Competency Development

- Strengthen communication across disciplines and levels.

- Develop consulting and advisory skills.
- Deepen knowledge of therapeutic areas and regulatory requirements.
- Improve programming and submission support capabilities.

Example Developmental Goals

- Developing and executing innovative programming solutions.
- Contributing to business process improvement.
- Contributing to submission planning.
- Input to ad-hoc deliverables such as abstracts, posters and publications.
- Peer mentoring.

Example Success Measures

- Client satisfaction and feedback.
- Quality and timeliness of deliverables.
- Contributions to publications and submissions.
- Evidence of mentoring and team development.

OTHER SKILLS DEVELOPMENT

As the role of data in drug development continues to evolve, technical expertise alone won't be enough. The ability to influence, support and collaborate across disciplines will hinge on strong interpersonal skills—being able to listen, ask the right questions, and communicate technical concepts to non-technical personnel. Developing these capabilities isn't just a nice-to-have; it's essential for realising potential and making sense of complex data in a way that drives meaningful decisions. When technical professionals combine data literacy with thoughtful engagement and strategic awareness, they become catalysts for progress.

CONCLUSION

Role titles may offer a shorthand for seniority or expertise, but they are often inconsistent between organisations across the industry. It is important to look at the role descriptions as the titles often obscure the rich diversity of responsibilities, skills, and development needs. This guide provides a practical framework to illuminate those nuances—clarifying role types, aligning them with key competencies, and outlining tailored growth pathways. By shifting the focus from titles to capabilities and aspirations, it empowers professionals to take charge of their development and equips leaders to support them more effectively. Whether you're just starting out, deepening your technical expertise, or stepping into leadership, this resource offers clarity, direction, and inspiration for navigating your career with purpose and confidence.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Author Name: Diana Stuart

Company: Veramed Limited

Address: 70 London Road, Twickenham, London. TW1 3QS

Email: diana.stuart@veramed.com

Website: www.veramed.com

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