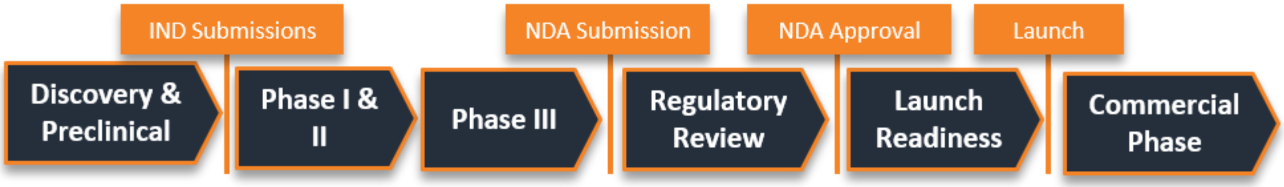
PRACTICAL CYBER – Pragmatic + Cutting-Edge = Greater Protection

SPECIAL HELP FOR PHARMA & THERAPEUTICS

COST-EFFECTIVE, INTEGRATED APPROACH TO BUSINESS FUNCTION, E-RISK MANAGEMENT & CYBERSECURITY

THE NEED FOR A DYNAMIC, INTELLIGENT COMPUTING TECHNOLOGY ROADMAP

Almost all pharma companies evolve and grow along this path:



IND Submissions

NDA Submission

NDA Approval

Launch

Discovery & Preclinical

Phase I & II

Phase III

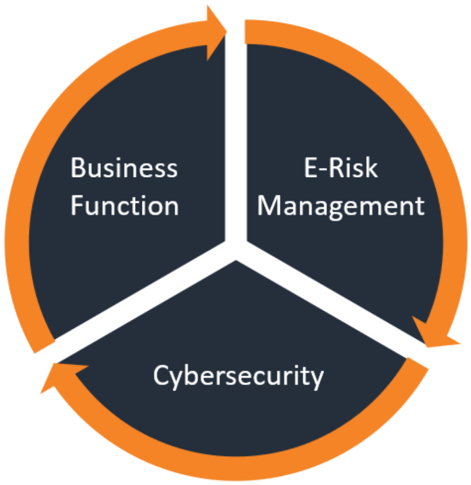
Regulatory Review

Launch Readiness

Commercial Phase

To grow and thrive, all pharma companies must intelligently deploy a mix of computing technologies: e.g. laptops, desktops, smart phones, networked printers, servers, on-premise software, and cloud-based software. Indeed, every aspect of a pharma's operations – research and development, internal and external communications, fund raising, financial systems, human resources, distribution, marketing, sales—all depend integrally on computing technologies. To use computing technologies well, companies need an intelligent roadmap that helps them pick, implement, and secure from cyber attack the right mix of computing technologies for each stage of growth.

To be effective, your computing roadmap must simultaneously and wisely integrate three areas:



Business Function

E-Risk Management

Cybersecurity

- **Business function:** Pick and implement the right mix of computing technologies for your business functions in each growth stage, spanning document creation, communications, document management, finance, human resources, contract management, manufacturing, distribution, and sales.
- **E-risk management:** Identify and quantify your cyber risks (e.g. risks that your computing technologies will not function properly or held hostage for ransom and/or your data will be destroyed, corrupted, or stolen) so you can make intelligent decisions about which risks to (1) internalize and mitigate via cybersecurity and (2) which to cover with insurance.
- **Cybersecurity:** Pick and implement the right defenses to mitigate your internalized cyber risks, including a cyber risk assessment that covers your financial risk, an incident response plan to reduce harm from attacks, and a dynamic set of customized defenses.

An intelligent computing technology roadmap will help you meet your evolving needs by ensuring your company has the appropriate tools and information to efficiently execute its business plan (e.g. save time and money), while substantially reducing its cyber risks. Unfortunately, during the early stages – e.g. Discover & Preclinical and Phase 1 – many pharmas don't invest enough in crafting a computing technology roadmap, failing to identify with the right mix of function, e-risk management, and cybersecurity.

From discussions with many pharma executives we've learned the two most common reasons for this under-investment are (1) underestimating the probability of cyber-attack and its related impact and (2) overestimating the cost of the expert, third-party help needed to create and implement an intelligent computing roadmap.

UNDER-ESTIMATING CYBER-ATTACK PROBABILITY AND IMPACT

Pharma executives who are not materially worried about cyber-attack should understand what happened to Merck in June 2017 when it got hit by the NotPetya cyber-attack:

- On June 27, 2017, despite Merck having a dedicated, well-staffed internal cybersecurity team, the NotPetya cyber-attack infected tens of thousands of Merck's computers in 65 countries.
- In various public disclosures, Merck estimated the attack cost them about $915 million – stemming from the attack crippling in-house API manufacturing and hindering its R&D, other operations, and formulation and packaging systems;
- Merck reported the attack had a $260 million impact on sales, $330 million impact on marketing and administrative expenses and production costs, and a $200 million impact on 2018 sales through residual backlog.

Many other major companies fell victim to NotPetya – the international law firm DLA Piper (which has a sophisticated cybersecurity practice but did not announce a damage amount), Reckitt Benckiser (announced $136 million in damage), FedEx (announced $300 million in damage), the advertising group WPP (announced $19.25 million in damage), and the shipping giant A.P. Moller-Maersk (announced $136 million in damage). All of these major companies had cybersecurity systems far more sophisticated than most early stage pharma companies.

The bottom line is that almost every aspect of every pharma company is highly dependent on computing technologies; and that cyber-attacks like NotPetya are becoming more prevalent, more sophisticated, and faster. Together, this means that pharma's cyber-risks are already material and continue to grow. This is partially why the SEC in its February 2018 Commission Statement and Guidance on Public Company Cybersecurity Disclosures, 17 CFR Parts 229 & 249, seems to have imposed a duty to investigate cyber risks and disclose material ones.

OVERESTIMATING THE COST OF EXPERT, THIRD-PARTY HELP

This reason for under-investing is all-to-understandable, because in many instances the expert help needed to create and implement an intelligent computing roadmap can be expensive. It involves hiring expensive experts in each category:

- **Business function:** A full-time smart, talented CIO with significant pharma experience ($200-250K per year)
- **E-risk management:** (1) A full-time expert in enterprise risk management ($80-100K per year); (2) a full-time expert in the complex and rapidly changing world of cyber liability insurance ($80-$100K per year), and (3) a part-time privacy/cyber lawyer ($30-50K year).
- **Cybersecurity:** A full-time smart, talented CISO with significant pharma experience ($200-250K per year).

Total cost can range from $510 to $650K.

To help alleviate this financial burden, Practical Cyber has teamed up with a smart, talented, and experienced former pharmaceutical industry CIO, Richard Cella. Mr. Cella was the CIO for two different pharmaceutical companies for over 10 years. For the last 8 years, as an outside CIO, he has assisted several small and medium-sized pharmaceutical and biotech companies in developing and implementing computing technology strategies covering all aspects of their business functions. His broad pharmaceutical business function expertise includes clinical, regulatory, quality, supply chain, commercial, and financial systems. His pragmatic approach to the technological and cybersecurity aspects of pharmaceutical business operations help provide a balanced and affordable approach for small companies.

To supplement Mr. Cella's business function expertise, Practical Cyber delivers the cutting-edge and pragmatic cybersecurity expertise of Dr. Marc Rogers, an international expert, and the e-risk management and legal expertise of Elliot Turrini.

Purdue University's Dr. Marc Rogers

Internationally known cybersecurity expert

Director Purdue Cyber Security and Forensics Lab and graduate program (the number one program in the nation)

Excellent practical experience while a professor at Purdue:

- Led over 125 cyber incident response investigations – including several for Fortune 100 companies;
- Created over 100 cyber incident response plans – including for several Fortune 50 companies.
- His clients have spanned various industries including technology, financial services, healthcare, manufacturing, etc.

Former Federal Cybercrime Prosecutor Elliot Turrini

Former federal cybercrime prosecutor where he handled the Melissa Virus prosecution; the UBS insider attack case; and other major investigations and prosecutions

Cyberlaw and privacy attorney in private practice – covering all aspects of cyber and privacy law

Editor & Author of Cybercrimes: A Multidisciplinary Analysis – a book published 2010 – covering all aspects of cybersecurity

VP of Consulting Services Arete Advisors, a cybersecurity firm, 2017

General Counsel & EVP of 300 employee IT services firm 2004-07

Enterprise risk management and cyber liability insurance expert

As a service that evolves as you grow along the pharma path, Practical Cyber provides pharma companies a dynamic, intelligent computing technology roadmap for a fraction of the typical cost.

Contact Practical Cyber:

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