Disease State Primer: Melanoma

2011 Q4 Update
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Lumleian offers the requisite scale and depth of life science expertise required for our client’s most critical investment decisions; We offer universal information and real time knowledge.
To ensure real-time knowledge, across disease states, our team of 30+ clinicians and Ph.D. scientists maintain a comprehensive knowledge management platform, leveraging novel data mining technology and proprietary analytics.

Notes: ¹These are a representative sub-set of the publicly available data sources
Our efficient platform and our expertise based teams enable us to both deliver the highest quality product and tailor our offer, to specific client needs: Either custom decision support or more standardized research and analytics, e.g. disease state primers.

**Decision Support**
- Clinical strategy
- Portfolio optimization
  - Pre-Clinical
  - Clinical
- Transaction support
  - In licensing
  - Out licensing

**Proprietary Analytics**
- Asset valuation
- Epidemiologic forecasts
- Industry benchmarks
  - Commercial
  - Clinical Development
- Patient segment valuations
- Promotional response models
  - Healthcare professional
  - Direct to consumer
- Royalty monetization

**Functional Drill Downs**
- Real-time clinical data
  - Trial strategies
  - Results
- In licensing assessments
  - Pre-clinical
  - Clinical
- Preliminary due diligence
  - Scientific
  - Clinical
  - Commercial

**Disease State Primers**
- Disease overview and care paradigm
- Clinical development pipeline
- Commercial landscape
What is a Lumleian’s disease state primer?

What information is included in a disease state primer?
- Lumleian’s objective and fact based perspective on the relative attractiveness of investing in a given disease state
- Disease overview and care paradigm
  - Etiology, Diagnosis and patient segmentation, Global epidemiology, Treatment algorithm, Clinical evidence, Emerging care paradigm
- Clinical Development Pipeline
  - Validated industry pipeline for all assets in clinical development, Select mechanism of action profiles, trial designs and evidence
- Commercial landscape
  - Global, US, EU, Japan market and brand revenue, Pipeline forecasts, US growth decomposition, Promotional spend and messaging

What disease states are planned for 2012?
- Autoimmune: Inflammatory Bowel Disease, Lupus, Multiple Sclerosis, Psoriasis, Rheumatoid Arthritis
- Cardiovascular: Hyperlipidemia
- Central Nervous System: Alzheimer’s Disease, Depression, Pain, Schizophrenia
- Endocrine: Type II Diabetes, Obesity
- Infectious Disease: Acute Bacterial Infections, Hepatitis C Virus
- Oncology: Breast, Colorectal, Leukemia(s), Lung, Lymphoma(s), Melanoma, Ovarian, Pancreatic, Prostate
- Pulmonary: Chronic Obstructive Pulmonary Disease, Idiopathic Pulmonary Fibrosis

Can we create custom disease state primers for customers?
- Yes, based on the expertise of our team of 30+ clinicians and Ph.D. scientists, 5 Ph.D. economists and statisticians we can create a custom primer in approximately 3 to 4 weeks
- We can supplement the primers with deeper analysis to help customers reach a deeper understanding of critical issues e.g. KOL interviews, Financial Models, Survey Conduction and Analysis, Pre-Clinical Asset Assessment
- We are also developing deep drills by function, e.g. Discovery, Clinical development, Business development, Commercial

Why did we create our disease state primers?
- We were frustrated by having to repeatedly validate, standardize, and collate pipeline and commercial data
- Portfolio optimization requires a standard framework to compare “apples to apples” investment decisions across disease states
- Our primers began as a training tool; We require every decision scientist create one from scratch before supporting clients
Executive Summary: Despite two recent approvals (Yervoy and Zelboraf) offering greatly improved outcomes, unmet need remains acute with a median survival of <1 year; development of new generation of targeted therapies offers promise.

**Disease Overview and Care Paradigm**
- Melanoma is the deadliest form of skin cancer, with incidence directly correlated to skin pigmentation and lifetime sun exposure
  - The increasing population of fair-skinned peoples towards the equator and the popular trend for natural and artificial tanning has contributed to the rising incidence of metastatic melanoma
- Under the current standard of care, early stage and localized melanomas are surgically resected, with good prognosis
  - However, metastatic melanoma prognosis remains poor
  - The last 12 months have seen the beginning of a new era in the treatment options available for patients with metastatic melanoma; the treatment paradigm has moved in large part towards Yervoy or Zelboraf in 1st line metastatic melanoma
- Looking forward, Lumleian foresees step-wise improvement in the care paradigm, including: (1) Testing and increased use of targeted therapies, as single agents and in combination (2) Development of immune strategies for melanoma treatment, and (3) Use of bio-markers to monitor progression and inform treatment

**Clinical Development Pipeline**
- Lumleian validated 39 assets in ‘active’ clinical development for melanoma with kinase inhibition strategies dominating the industry’s clinical development pipeline
  - Abnormal activation of BRAF, KIT and MEK1/2 is strongly correlated with metastatic melanoma; inhibitors of these three kinases are in clinical trials for treatment of metastatic melanoma
  - Zelboraf, a BRAF inhibitor, was approved by the FDA in 8/2011
  - Inhibitors of PI3K, mTOR, VEGFR, and Bcl-2, all of which are frequently activated in cancer, are in clinical trials for treatment of metastatic melanoma
- Immunotherapies, which stimulate the immune system response against melanoma, are an established MOA for first-and second-line melanoma treatment
  - New immunotherapies, including ONTAK, Leukine and Allovectin-7 are in clinical trials; however, it is unknown whether they will overcome the significant safety concerns associated with increased immune activity
- Melanoma vaccines are also in various stages of clinical development; a number of melanoma-associated peptide vaccines are being tested, alone and in combination

**Commercial Landscape**
- Global ’11 brand revenue increased to ~$0.5B compared to ’10, driven by Yervoy and Zelboraf launches; The market is forecast to grow by ~30% annually between ‘12 and ’15, with strong growth of Yervoy and Zelboraf, and the anticipated launches of Allovectin-7 and Dabrafenib
  - United States ’11 brand revenue increased nine-fold to ~$0.4B compared to ’10; Including pipeline assets, brand revenue is forecast to grow at ~32% annually between ‘12 and ’15; Q4 ’11 sales soared to ~$151M, driven by the launch of Yervoy in Q2 and Zelboraf in Q3

Greenfield investment in late stage clinical development, for melanoma, is a high risk vs. moderate reward proposition; probability of technical success is low and the market is small, but there is high unmet need and the regulatory environment is favorable.

### Melanoma: Relative Attractiveness of Greenfield Investment in Late Stage Clinical Development

<table>
<thead>
<tr>
<th>Level of Unmet Need</th>
<th>Likelihood of Technical Success</th>
<th>Regulatory Environment</th>
<th>Commercial Attractiveness</th>
<th>Required Investment</th>
</tr>
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<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>Greenfield</td>
<td>Average</td>
<td>High</td>
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</table>

#### Clinical Unmet Need
- Existing treatments for metastatic melanoma provide brief remission and an average patient survival time of <1 year
- Few FDA-approved treatments for metastatic melanoma

#### Global Epidemiology
- WW 210,000 incidence

#### Disease Burden
- Economic cost of $500 million annually (US)
- High mortality

#### High Mortality
- Mean life expectancy for metastatic melanoma is <1 year

#### Target Patient Populations
- Incidence of melanoma and melanoma mortality is highest in Caucasians
- Recruitment for clinical trials has not been an acute challenge

#### Historically Understood Etiology
- Link to genetics and sun exposure
- BRAF, KIT pathway activity

#### Recent Examples of Phase III Failures
- Tasisulam (Eli Lilly)
- Elesclomol (Synta)
- Tremelimumab (Pfizer)
- Reylimid (Celgene)

#### Clinical Unmet Need
- Few FDA-approved treatments for metastatic melanoma
- Existing treatments for metastatic melanoma provide brief remission and an average patient survival time of <1 year

#### Historical Precedents
- March ‘11, Yervoy approved
- April ‘11, Sylatron approved
- August ‘11, Zelboraf approved

#### Advocacy
- American Cancer Society

#### Market Size
- ~11,200 US with metastatic melanoma
- ~$2.4B in ’15, potential for dramatic growth

#### High Mortality
- ~9,000 deaths in 2011 from melanoma

#### Attractive Pricing
- Zelboraf - $54,400/6 months
- Yervoy - $60,000/6 months

#### Generic Penetration
- Generic chemotherapy with low performance
- New launches would largely erode generic chemo agents

#### Competitive Launches
- Vical's Allovecin-7 (’13)
- GSK's Dabrafenib (’13)

#### Phase III Investment
- Phase III trials require at least 300 patient trial
- Expensive monitoring costs during trial

#### Commercial Spend
- Low commercial spend; highly data driven
- Focused audience would be medical oncologists

#### Phase IV Investment
- Limited requirements due to short survival period
- Combination trials may be required to demonstrate sufficient agent efficacy for regulatory approval

What are the key questions for 2012?

**Key Questions**

- **Personalized Medicine:** How will personalized medicine change patient selection for clinical trials and treatment selection for patients?
  - Phase II and III trials for Zelboraf were restricted to patients with a common melanoma mutation, BRAF-V600, which showed the strongest response to Zelboraf treatment; will sequencing for BRAF-V600 and other key mutations become a routine clinical process?
  - Specific mutations are also implicated in targeting of MEK1/2 and KIT

- **Combination Trials:** How will clinical trials for combinations of targeted therapies, immunomodulators, melanoma vaccines, and other treatments change the treatment of metastatic melanoma?
  - Nexavar, which has performed poorly as a single agent, is in combination trials, including two Phase II trials with primary completion dates in 2012; its future as a treatment for metastatic melanoma depends on performance/synergy with other drugs
  - Combination trials between immunomodulators (i.e. Yervoy, Sylatron) and melanoma vaccines may produce significant synergies by simultaneously activating immune system against melanoma and increasing immune response
  - A combination of radiation treatment and Yervoy produced an increased immune response against metastatic melanoma, possibly due to increased antigen exposure; further tests are underway

**Lumleian’s Perspective**

- **Clinical Development:** The recent approvals of Yervoy and Zelboraf have changed the treatment paradigm for metastatic melanoma, pushing forward what is likely to be a permanent shift to targeted agents and immunotherapies
  - Targeted therapies currently in the pipeline are unlikely to replicate or improve upon the success of Yervoy and Zelboraf as single agents
  - Combination trials are underway for numerous targeted therapies, including Zelboraf and Yervoy; based on the molecular profile of melanoma, treatment synergies are expected
  - Increased sequencing of tumor-causing mutations will increasingly inform targeted therapy treatments

- **Regulatory Environment:** Due to the high mortality and shortage of effective treatments for metastatic melanoma, regulatory approval quickly follows a successful clinical trial
  - Zelboraf, Yervoy and Sylatron were all approved for treatment of metastatic melanoma in 2011, after accelerated approval processes

Clinicians stage patients based on tumor depth, grade and degree of metastasis; the treatment paradigm for Stage I-II (resection) and III (resection with adjuvant chemotherapy) established but treatment of Stage IV melanoma is evolving with newly approved agents.

<table>
<thead>
<tr>
<th>Stage I</th>
<th>Stage II</th>
<th>Stage III</th>
<th>Stage IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Presentations</td>
<td>-85%</td>
<td>~10%</td>
<td>~5%</td>
</tr>
<tr>
<td>Criteria</td>
<td>Melanoma in situ, up to 2 mm thick</td>
<td>Melanoma in situ, up to 4 mm thick</td>
<td>Melanoma has spread, either to local lymph nodes or satellite tumors, no more than 2 cm from primary tumor</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>1st line</th>
<th>2nd line and 3rd line (Recurrent Disease)</th>
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<tbody>
<tr>
<td>Treatment</td>
<td>Surgical resection for all accessible (non-ocular) melanomas followed by:</td>
</tr>
<tr>
<td></td>
<td>- Stage III: Adjuvant chemotherapy (usually Sylatron, or other immunotherapy)</td>
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<td></td>
<td>- Stage IV: Historically chemotherapy, usually DTIC-Dome, has been the SoC</td>
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<td></td>
<td>- Stage IV: Yervoy, Sylatron and Zelboraf have recently been approved for 1st line treatment and are being actively studied in combinations with chemotherapy and with each other</td>
</tr>
<tr>
<td></td>
<td>- Stage IV: Zelboraf is approved for the treatment for BRAF (V600E) mutation positive metastatic melanoma</td>
</tr>
</tbody>
</table>

| Five Year Survival Rate | 85-90% | 40-85% | 25-60% | 9-15% |

Sources: www.clinicaltrials.gov; http://www.cancer.gov/cancertopics/pdq/treatment/melanoma/
The last 12 months have seen the beginning of a new era in the treatment options available for patients with metastatic melanoma; the treatment paradigm has moved in large part towards Yervoy or Zelboraf in 1st line metastatic melanoma patients.

**Diagnosis (Current)**
- Diagnosis is based on tumor size/thickness and extent of invasion
  - Breslow Classification (vertical thickness of the tumor)
  - Clark Level (extent of tumor invasion)
  - TNM Staging System (tumor, node, metastasis)
  - Overall Stage Grouping/Roman Numeral Staging (Stage I - IV)

**Treatment (Current)**
- Course of treatment depends on staging
  - All stages begin with surgical resection, where operable
  - If melanoma recurs, patients are reclassified as Stage III or IV
- Stage III melanoma
  - Resection 1 followed by adjuvant immunotherapy
- Stage IV melanoma: Historic SoC
  - Anti-neoplastic chemotherapy, most commonly DTIC-Dome, has been the historic SoC with OS rates of 6-12 months and tumor shrinkage in ~15-20% of patients
  - Immunotherapy achieves tumor shrinkage in ~15-20% of patients, half of these achieving a complete response
  - Given the length of therapy and toxicities, this is typically reserved for a sub-set of healthier patients
- Stage IV melanoma: Emerging SoC
  - Yervoy, an immunomodulator, was recently approved by the FDA as a single-agent treatment for Stage III/IV melanoma and offers ~10 month median OS and ~25% two year survival rate
  - In combination with DTIC-Dome, Yervoy offers ~11 months median OS and an ~30% two year survival rate
  - Zelboraf, a BRAF inhibitor, a kinase inhibitor approved as mono therapy and in combination for BRAF (V600E) mutation positive metastatic melanoma, ~40% of patients
  - Combination treatment is generating interest (Yervoy and Zelboraf), with the hope of a rapid and durable response
  - Yervoy offers durability and Zelboraf offers rapid onset

Notes: ¹Where operable; 2 Alternatives include temodtemozolomide and paclitaxel with or without carboplati
Sources: www.clinicaltrials.gov; http://www.cancer.gov/cancertopics/pdq/treatment/melanoma/
PI3K/mTOR inhibitors, which are being tested in a broad range of cancers, are also in clinical trials for metastatic melanoma.

Physiology
- The PI3K/mTOR pathway mediates cell growth, proliferation and survival

Pathophysiology
- Hyperactivation of the PI3K/mTOR pathway can result in inappropriate cell growth, proliferation and survival

Hypothesized Mechanism
- Inhibition of the PI3K/mTOR pathway can abrogate the cell proliferation and survival signals that tumors depend upon
  - PI3K inhibitors in Phase I/II development for metastatic melanoma include BEZ235 and BKM120
  - mTOR inhibitors in Phase I/II development for metastatic melanoma include Torisel and Afinitor; current clinical data does not demonstrate a significant improvement over existing standard chemotherapies

Pipeline
- Phase II
  - BEZ235 (MRK)
  - BKM120 (NVS)
  - Torisel (MRK)
  - Afinitor (NVS)
United States ’11 brand revenue increased nine-fold to ~$0.4B compared to ’10; including pipeline assets, brand revenue is forecast to grow at ~32% annually between ‘12 and ’15; Q4 ‘11 sales soared to ~$151M, driven by the launch of Yervoy in Q2 and Zelboraf in Q3.

Notes: Branded sales excludes generic revenues; Pipeline includes: Vical’s Allovectin-7 (’13), GSK’s Dabrafenib (’13)

Sources: Lumleian estimates based on publicly available data from bio-pharmaceutical companies (financial statements, investor presentations, analyst day transcripts); 3rd party equity research reports; Bio-Pharma Insight
Wall Street consensus estimates that new product launches will increase the ‘15 global market by ~$200M, driven largely by anticipated launches for Vical’s Allovectin-7 and GSK’s Dabrafenib.

Updated: 03/15/12

Sources: Consensus estimates based on publicly available equity research forecasts that have been updated in the past 12 months (since 02/15/11); Consensus estimate is the ‘straight line’ average with each bank’s forecast weighted equally

Notes: These forecasts are not representative of Lumleian’s viewpoint; Ad-hoc Lumleian develops its own forecasts for clients based on its proprietary analytics and research; Pipeline includes: Vical’s Allovectin-7 (‘13) & GSK’s Dabrafenib (‘13)
In the three months ending in October, ‘11 total promotional spend grew ~138%; healthcare professional spend increased by ~136% corresponding to Yervoy/Sylatron/Zelboraf’s approval in Q2 and Q3; as expected, Zelboraf dominated physician share of voice.

Total Promotional Spend ($M)

Updated: 03/15/12

Note: Healthcare Professional (HCP) spend includes marketing to physicians, nurse practitioners, physician assistants through marketing & event promotions, journals, and online promotions; Direct to Consumer (DTC) includes marketing channels in television, radio, newspapers, magazines, outdoor advertisements, and internet; 3 month rolling (3MR) compares spend for the 3 months 8/11-10/11 vs. the 3 months 5/11-7/11

Sources: SDI (IMS) Promotion Audits, Kantar Media Research 2010 - 2011
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<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>AB</td>
<td>AB Science</td>
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<td>ARRY</td>
<td>Array Biopharma</td>
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<td>AU</td>
<td>Australia</td>
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<td>AZN</td>
<td>AstraZeneca</td>
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<td>B</td>
<td>Billions</td>
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<tr>
<td>Bcl-2</td>
<td>B-cell lymphoma 2 (protein)</td>
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<tr>
<td>BiIB</td>
<td>Biogen IDEC</td>
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<tr>
<td>BMY</td>
<td>Bristol Myers Squibb</td>
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<tr>
<td>CELG</td>
<td>Celgene</td>
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<tr>
<td>CNS</td>
<td>Central Nervous System</td>
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<td>EU</td>
<td>European Union</td>
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<td>EXEL</td>
<td>Exelexis</td>
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<td>FDA</td>
<td>US Food and Drug Administration</td>
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<td>GlaxoSmithKline</td>
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<td>IL-2</td>
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<td>JP</td>
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<td>Kg</td>
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<td>mg</td>
<td>milligrams</td>
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<td>MoA</td>
<td>Mechanism of Action</td>
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<td>MRK</td>
<td>Merck</td>
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<tr>
<td>mTOR</td>
<td>Mammalian Target of Rapamycin (protein)</td>
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<tr>
<td>NDA</td>
<td>New Drug Application</td>
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<td>PI3K</td>
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<td>United States</td>
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<td>VEGFR</td>
<td>Vascular endothelial growth factor receptor (protein)</td>
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<td>VICL</td>
<td>Vical Inc.</td>
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<td>YTD</td>
<td>Year to date</td>
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As a leadership team, we designed Lumleian’s business model based on our collective experience in: academic R&D, bio-pharmaceutical industry, equity research and strategy consulting...

- **Frank Deane, Ph.D.** is a Director of Decision Science and Founder of Lumleian. Frank has over ten years experience working with life science companies and concurrently holds an appointment in the department of strategy at the Carroll School of Management, Boston College, where he teaches ‘Strategic Issues in Pharma and Bio-Tech,’ to MBA students. Prior to founding Lumleian, Frank was a director with Leerink Swann and a case team leader with Bain, where he gained substantial operational experience growing and operating a diverse set of businesses. Frank entered consulting after spending three years in the bio-pharmaceutical industry with Eli Lilly, supporting portfolio optimization and business unit strategic planning. He began his career, as a quantitative risk analyst working at BlackRock. Frank earned a Ph.D. in econometrics from the Krannert School of Management at Purdue University, where his dissertation focused on applying game theory and statistical modeling to optimize pharmaceutical sales and marketing resources. Frank has a bachelor of arts in economics from Princeton University.

- **Mark Hochstetler, MBA** is a Director of Decision Science at Lumleian. Mark has over ten years experience working with life science companies. Prior to joining Lumleian, Mark served as the CFO at OPK Biotech, which focuses on developing oxygen therapeutics for the treatment of anemia, ischemia, and trauma. Before segueing to industry, Mark spent 5 years as a strategy consultant and equity research analyst at Leerink Swann, where he covered: Array, Arqule, Ariad, Celgene, Chelsea, Cougar, Cubist, Genentech, GTx, Hana, Idenix, InterMune, Kosan, Millennium, MGI Pharma, Onyx, Poniard and Vertex. Mark earned an MBA from Duke University’s Fuqua School of Business with a concentration in health sector management. Mark has a bachelor of arts in political science from Stanford University.

- **Sarah Haigh Molina, Ph.D.** is a Manager of Decision Science at Lumleian, where she leads the Academia and Non-profit practice. Sarah has over ten years experience working and researching in the life sciences. Prior to joining Lumleian, Sarah was an Assistant Professor of Medicine at Boston University School of Medicine where she served as the Director of High-throughput Screening. Before returning to academia, Sarah was US Operations Manager at Molecular Cytomics. Sarah earned a Ph.D. in biology from York University, an MBA from Boston University with a concentration in entrepreneurship, and a bachelors of science in biochemistry from Dundee University.
Having lived the client experience, we know quality is paramount, and pioneered our approach with quality and process efficiency as dual mantras.

- **Jean Kung, M.Eng, MBA** as Manager of Process Efficiency and Quality Control oversees day-to-day operations and finances at Lumleian and has over five years experience working in the life sciences. Jean designed the process by which Lumleian efficiently and effectively creates and quarterly updates its disease state primers and serves as the final point of quality control. Prior to joining Lumleian, Jean served as a contract project manager to various life science clients. Before entrepreneurship, Jean was a clinical research associate at Health Policy Associates and a researcher at the Harris Orthopedic Biomaterials and Biomechanics Laboratory, Massachusetts General Hospital. Jean earned a masters of science in biological engineering from Cornell University and an MBA in the Health Sector Management Program from Boston University with a concentration in operations and technology management. Jean has a bachelor of science and masters of engineering in biological engineering, also from Cornell University.

- **Morgen Caroll, MBA** as Manager of the Customer Experience at Lumleian, aspires to provide Lumleian's clients with superior care and service based on their particular needs. Morgen brings over five years life science experience and has a background in Marketing, Sales, and Public Relations. Prior to joining Lumleian, Morgen worked at GlaxoSmithKline, with responsibility for the company’s flagship cardiology and endocrinology products. At GlaxoSmithKline, Morgen was a primary care and specialty care sales representative while serving as a liaison between product management teams and field sales. As a representative, Morgen consistently ranked in the top 10% of GSK’s sales force, despite working in an inner city territory with significant access challenges. Prior to entering the life sciences Morgen worked on the sales and marketing staff at Philadelphia Magazine and Food & Wine Magazine. Morgen earned an MBA from the Villanova School of Business with a concentration in marketing, and a bachelor of arts in English from Gettysburg College.

- **Qingwei Sun, M.Eng., MS** as a Decision Science Analyst oversees secondary data collection, synthesis and analysis and designed analytical methodologies fundamental to Lumleian’s knowledge management platform. KM database. Using meta-analysis method, he aggregates the clinical and commercial data required to generate Lumleian’s disease state primers. His work has wide application in product development, portfolio management, and investment strategy for both large pharmaceutical companies and emerging bio-techs. Qingwei, who is fluent in Chinese and Japanese, leads our work with Asian clients. Qingwei joined Lumleian after obtaining a master of science degree from Harvard School of Public Health. He earned both bachelor and master of engineering degrees from Kyoto University, Japan, concentrating in materials science.
We recruit decision scientists explicitly for their expertise and relevant experience across the gamut of major therapeutic areas and disease states.

- Whitney Amyot, Ph.D. as Decision Scientist focusing on infectious disease leverages her expertise in scientific investigation and infectious disease to support primary and secondary research for strategic decision making with biopharmaceutical clients and investors. She has more than ten years of experience in scientific research, including positions at Atlanta’s Veteran Affairs hospital and in the pharmacology department at Emory University School of Medicine. In her current role Whitney provides a broad knowledge base to ensure Lumleian is up to date on current discovery and clinical trends. Whitney earned a Ph.D. in Molecular Microbiology from Tufts University Sackler Graduate School of Biomedical Sciences where her dissertation focused translocation in the bacterium Legionella pneumophila. Whitney has a Bachelor of Science degree in Biology from Emory University.

- Alice S. Kaanta, Ph.D. as Decision Scientist focusing on oncology is responsible for leading a team of decision scientists in reviewing the scientific, clinical and regulatory landscape in numerous oncology indications. Alice has over ten years of experience in scientific research, in both academia and industry, where her primary focus has been on cancer research. Alice earned her Ph.D. in Biological and Biomedical Sciences from Harvard University. At Harvard, Alice worked in the Brugge Lab studying the regulation of pro-apoptotic Bcl-2 family member Bim in breast cancer progression and in the Neel lab where she identified and characterized a novel multi-potent mammary progenitor with pregnancy-specific activity. Alice earned dual bachelor of science degrees in Biology and Physics from the Massachusetts Institute of Technology.