



**The Future of AI in Healthcare is Now**



# **Alliances in Oncology**

**Artificial Intelligence and Machine Learning  
Platform for Cancer Care**

**Proposal**



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### Mission

**DATA DRIVEN HEALTH (DDH)** is dedicated to the application of machine learning and artificial intelligence to solve today's health care data challenges.

### Goal

**DDH is seeking Alliance Partners** to implement their AI-powered data platform to revolutionize the field of oncology with applications across the landscape from discovery through the clinical/regulatory development pathway, to personalized patient care.

### The Company

DDH is a leading independent healthcare technology company providing near real-time actionable data & analytic-driven solutions/services that help improve clinical, financial, provider and patient engagement outcomes throughout the healthcare ecosystem.

At the heart of healthcare today is the need to manage, aggregate and analyze large amounts of complex disparate data in a continuous manner, acquire meaningful insight from the results, and use these insights to drive material change to patient outcomes and economics. With the vast amount of data available in the healthcare sector (financial, clinical, R&D, administration, and operational data), big data can derive meaningful insights to improve the operational efficiency of the industry.

DDH applies their **proprietary algorithms** for deep machine learning, predictive analytics, and artificial intelligence to identify gaps in care, to boost operational and clinical efficiencies, to drive innovation, and ultimately to inform provider and patient behaviors that optimize health outcomes.

### Northwell Health Data and AI Development Partnership

DDH has established a proprietary data and AI development partnership with Northwell Health that provides unlimited access to their data systems and internal health information exchange (HIE) across the Northwell system. Northwell Health is the largest integrated healthcare delivery network in New York State. With 22 hospitals, 800 outpatient facilities, and over 30,000 providers, Northwell cares for and maintains data on **11 million patients**.

All clinical, financial, operational, and business systems are integrated in the Northwell HIE, enabling true population health management to optimize clinical and economic outcomes across disease indications and patient populations. In collaboration with Northwell Health, DDH has built **Population Advisor**, a national population health and quality improvement model that implements a simple and effective approach to educate and motivate clinicians to improve quality of care provided in their practice. The **Population Advisor** solution enables reporting and clinical guidance at the point-of-care through the electronic health record (EHR), providing the provider and patient with information and education to optimize outcomes.



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Population Advisor Key Components:

- Clinician Performance Dashboards provide a visual reflection of selected patient populations/performance measures – collecting both clinical and claims data
- Stakeholder Dashboard provides all metrics on National/Regional/State/Practice levels
- Link a provider's near-real-time patient data to educational resources
- Identify care gaps & close through actionable data-driven reporting and insights
- Clinicians are able to benchmark their performance with their peers and the nation
- Burden of Illness/Cost Savings Analysis
- Marry clinical and claims

Population Advisor provides health systems with a powerful tool to **improve their HEDIS scores**. By ingesting clinical data for populations that impact HEDIS measures, the system can identify gaps in care, offer education and point-of-care clinical guidance, measure health outcomes, and evaluate the impact of performance improvement programs. By closing gaps in care, hospitals, health systems, and providers improve HEDIS scores and increase revenues. The Population Advisor platform enables providers and payors to ensure that the right data is extracted from complex data sources to provide the “source of truth” to guide clinical decision making.

### Advances in Oncology through AI

Cancer is a simple word that belies the multi-dimensional complexity of disease diagnosis, treatments, and patient care. The DDH AI platform combined with the Northwell Health integrated data systems offer an opportunity to unravel the tangle of genetics, immunology, molecular pathways and targets, drugs and biologics that comprise cancer diagnosis and treatment. **DDH is seeking Alliance Partners** to develop and implement their AI-powered data platform at Northwell Health to revolutionize the field of oncology with applications across the landscape, providing opportunities to address a plethora of unmet needs in cancer diagnosis, treatment, and management.

### Applications in Research and Development

The platform facilitates research and development efforts in oncology by providing access to a wealth of integrated healthcare data, enabling researchers to analyze trends, treatment responses, and outcomes across diverse patient populations. With the integration of genomic and proteomic data, the AI system could identify new biomarkers and genetic profiles for the discovery of new drug targets or diagnostic strategies. This could ultimately support the advancement of precision oncology and the development of innovative cancer therapies.

Additionally, there are opportunities to develop **Cancer Diagnostic Algorithms (CDAs)** for primary diagnosis, staging, grading, and genetic/biomarker analysis. Based on recent regulatory approvals, CDAs can be approved and protected by the FDA, which makes them reimbursable products for oncology diagnosis and treatment. In particular, the immunotherapy field is ripe for AI analysis and treatment guidance.

The U.S. FDA has enacted regulations that allow for the submission of **Real World Evidence (RWE)** in support of regulatory approval. FDA Commissioner Robert Califf recently stated that he expects a growing number of regulatory decisions, such as expanded FDA approvals, will be based on real-world evidence from EHR data, not just within the FDA but across the federal



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government. The DDH platform enables retrospective analysis and virtual clinical trials to support the collection and analysis of RWE using the Northwell Health datasets. This capability is especially useful for treatment and disease management for complex conditions. In oncology for example, clinicians often utilize combination therapies that are effective for treating a specific tumor, but which may not be specifically approved by the FDA for that indication. As biologics, immune system modulators, and cancer vaccines become widely available for personalized therapy, identifying effective combination treatments for populations can provide the necessary RWE to support FDA approval.

The DDH system can be easily deployed to **identify patients for clinical trials**. The system could help match cancer patients with relevant clinical trials based on their specific demographic, genetic, and medical profiles. By integrating and analyzing diverse healthcare data, including patient records, genomic information, and trial databases, the platform could facilitate efficient and accurate patient-trial matching, thereby helping both patients and biopharmaceutical companies to accelerate the development of new oncology treatments.

### Applications in Personalized Cancer Care

By analyzing a wide range of healthcare data, including imaging studies, laboratory results, genetic and biomarker analysis, and patient history, the platform could leverage AI to identify potential markers or patterns suggestive of early-stage cancer. By enabling **early detection and diagnosis**, the system can improve prognoses and treatment outcomes.

The platform can integrate patient-specific data, including genomic information, tumor characteristics, personal health profiles, and treatment responses, to develop **personalized treatment plans** for cancer patients. AI algorithms could analyze this data to identify the most effective and tailored treatment options, and the Population Advisor tool can provide point-of-care guidance for physicians as well as personalized patient education.

By leveraging the power of AI and machine learning for **predictive analytics**, the platform could predict patient outcomes, treatment responses, and potential complications for cancer patients. This could assist clinicians in making more informed decisions and tailoring care plans to optimize patient outcomes. DDH has developed and implemented the **FluDemic™ AI Prediction Center** ([www.fludemic.com](http://www.fludemic.com)), a disease surveillance model that tracks and predicts infectious disease outbreaks to address the immediate needs of health systems and the communities they serve. The algorithms underlying the predictive analytics tools in FluDemic can guide the development of algorithms for tumor growth and response to therapy, furthering personalized care.

For patients undergoing cancer treatment, the platform's **remote monitoring** capabilities could enable continuous tracking of vital signs, symptoms, and treatment adherence. AI algorithms could analyze this data to identify potential complications early, allowing for timely interventions and support.

The system could also integrate pharmaceutical data and patient profiles for **safety monitoring** to identify potential drug interactions, contraindications, and adverse effects, particularly relevant in the context of cancer treatment where patients may be receiving multiple medications and treatments simultaneously.

### A Case in Point: Checkpoint Inhibitor Therapy

Checkpoint inhibitors represent 3 of the top 10 cancer treatments on the market, with Keytruda (\$20.9 B), Opdivo (\$8.2 B), Tecentriq (\$4.0 B) in sales<sup>1</sup>. Checkpoint inhibitors have shown remarkable success in treating various types of cancer, yet numerous challenges and unanswered questions remain. The DDH system could play a pivotal role in addressing several unknown aspects of checkpoint inhibitor therapy in cancer. Here's how the DDH AI platform could help:

- 1. Identifying Biomarkers for Treatment Response:** While some patients respond extraordinarily well to checkpoint inhibitor therapy, others do not experience the same level of benefit. An AI system could analyze large datasets encompassing genomic, proteomic, and clinical data to uncover predictive biomarkers associated with treatment response. By identifying specific patient profiles that are more likely to respond to checkpoint inhibitors, clinicians could make more informed treatment decisions and improve patient outcomes.
- 2. Understanding Resistance Mechanisms:** Resistance to checkpoint inhibitor therapy remains an obstacle in cancer treatment. AI-powered analysis of multidimensional data, including tumor genomic profiles, immune cell interactions, and treatment outcomes, could help uncover the molecular mechanisms driving resistance. This knowledge could lead to the development of novel combination therapies or personalized treatment approaches to overcome resistance and enhance the efficacy of checkpoint inhibitors.
- 3. Predicting Immune-related Adverse Events (irAEs):** While checkpoint inhibitors can stimulate the immune system to attack cancer cells, they can also lead to immune-related adverse events. An AI system could process diverse patient data to predict and monitor the risk of irAEs. By analyzing patterns in patient profiles, treatment histories, and immune system activity, the system could assist in preemptive management strategies to mitigate adverse events and optimize patient safety during checkpoint inhibitor therapy.
- 4. Tailoring Combination Therapies:** Checkpoint inhibitors are often combined with other treatments, such as chemotherapy, targeted therapy, or other immunotherapies. Understanding the optimal combinations for specific cancer types and individual patients is a complex task. An AI system could analyze large-scale data to identify synergistic treatment combinations, potentially revealing novel therapeutic strategies to enhance the effectiveness of checkpoint inhibitors.
- 5. Uncovering Long-term Outcomes:** Long-term follow-up data on patients receiving checkpoint inhibitors is critical for understanding sustained treatment responses and late-onset adverse events. An AI system could analyze real-world evidence and long-term patient outcomes to uncover trends, prognostic factors, and late effects of checkpoint inhibitor therapy, providing valuable insights into the durability and safety of these treatments.
- 6. Personalized Treatment Regimens:** AI systems could analyze diverse patient data, including genomic, imaging, and clinical parameters, to tailor personalized treatment regimens for cancer patients receiving checkpoint inhibitors. By considering individual patient characteristics and treatment responses, the system could help optimize dosing, scheduling, and supportive care,

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<sup>1</sup> <https://www.ipharmacenter.com/post/top-selling-cancer-drugs-2022-2023-best-cancer-products-ipharmacenter>



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potentially enhancing treatment efficacy while minimizing adverse effects.

7. Real-time Treatment Monitoring: Using AI algorithms, real-time monitoring of patients receiving checkpoint inhibitor therapy could facilitate the early detection of treatment responses or disease progression. By integrating diverse data sources, including imaging studies, laboratory results, and patient-reported outcomes, an AI system could provide clinicians with actionable insights, enabling timely treatment adjustments and improved patient care.

In conclusion, the application of the DDH platform in addressing unknown aspects of checkpoint inhibitor therapy in cancer has significant potential to advance our understanding of treatment response, resistance mechanisms, adverse events, long-term outcomes, and personalized treatment strategies. By leveraging comprehensive healthcare data and AI-driven analyses, we can accelerate the optimization of checkpoint inhibitor therapy and ultimately improve outcomes for cancer patients.

### Leadership

Our Team is made up of experts who have built some of the most admired healthcare information, data analytics, and population health solutions across multiple areas in the healthcare vertical.



#### Jack Rush, CEO

With over two decades of experience building public-private relationships and implementing multiple data-driven programs/processes across the healthcare ecosystem, Jack and the team at Data Driven Health are revolutionizing population health and disease surveillance through artificial intelligence.



#### Sanjay Pudupakkam, CTO

Sanjay has had a distinguished career in health information as VP of the Information Management and Analytics Consulting Practice at Optum, as well as at Accenture, Knightsbridge Solutions and Hewlett Packard. With over twenty-five years of experience in the field, he has been assisting companies grow their technological capabilities, developing solutions that truly provide value and empower patients and physicians toward better health and outcomes.



#### Richard Purcell, Business Development

Rich is the President of DNA Healthlink, Inc., a consulting firm that advises emerging biopharmaceutical and technology companies, healthcare providers, and educational institutions on new business strategy, operations management, and development of new products and services. Joining DDH in 2023, he offers a wealth of knowledge on oncology & immunology clinical development, data systems, regulatory affairs, and healthcare analytics.

**For more information on how Data Driven Health can advance your oncology and data strategies, contact us:**

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