Cancer Crosslinks 2016

19 October 2016

Using oncology big data to personalize insights and improve cancer care quality: Update on ASCO's CancerLinQ

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Vice President and Medical Director
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CANCER·LINQ

CancerLinQ Mission Statement

"Empowering the oncology community to improve quality of care and patient outcomes through transformational data analytics."
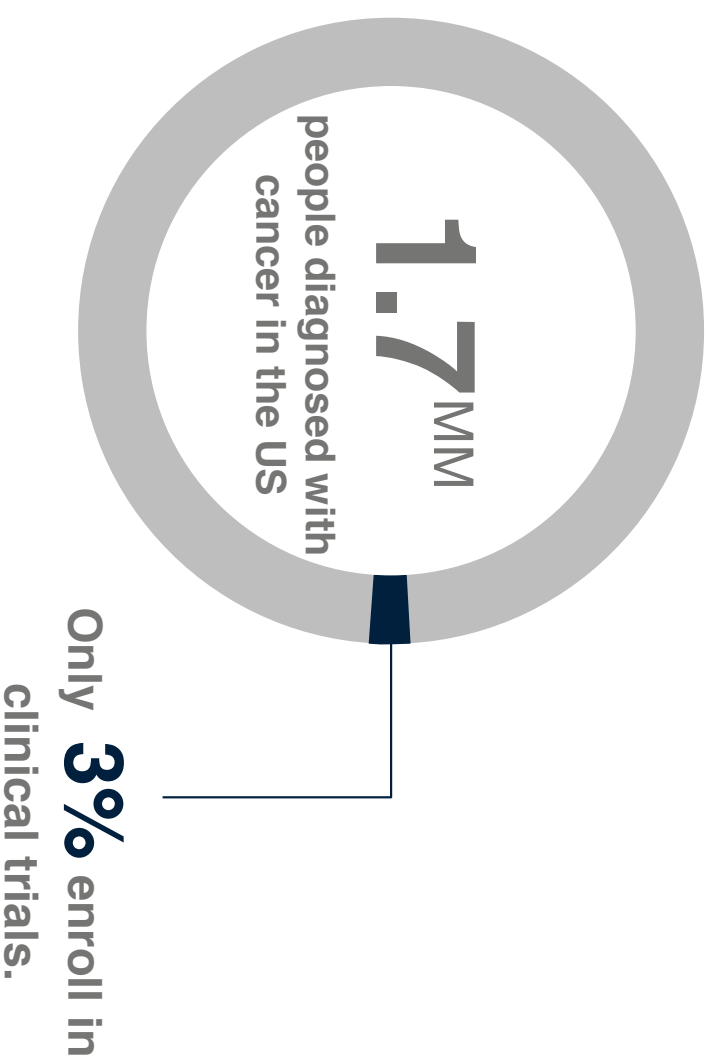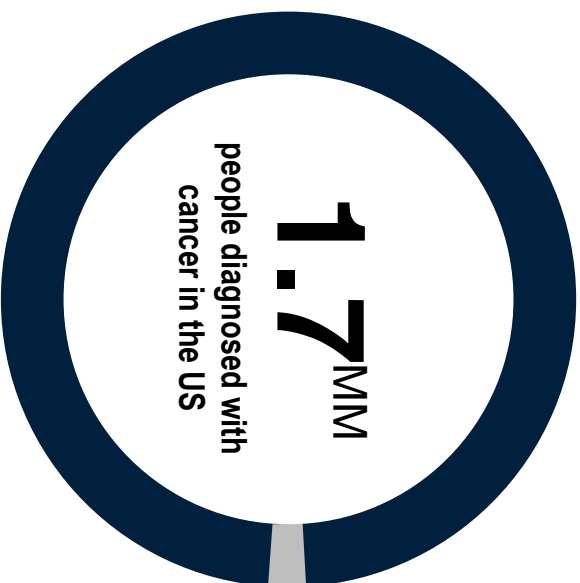
CURRENT ENVIRONMENT | MEETING PRESSING CARE NEEDS

Clinical trials don't tell the whole story

1.7MM

people diagnosed with cancer in the US

Only **3%** enroll in clinical trials.

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CANCER LINQ™
Learning Intelligence Network for Quality

Getting to the Data

1.7MM

people diagnosed with cancer in the US

97%

of patient data **locked away** in unconnected files and servers
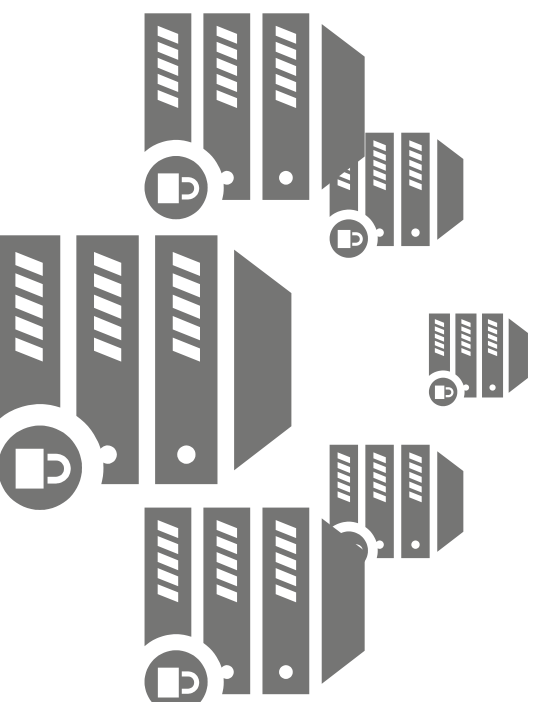
…And Available Data Have Limitations

Everyday patients tend to be…

older…

25% of clinical trial patients are **65+** [1]	vs	**61%** of real-world patients are **65+** [1]

less healthy…

40% of kidney cancer patients were not healthy enough to qualify for the trials that supported the approval of their treatments [2]

and more diverse…

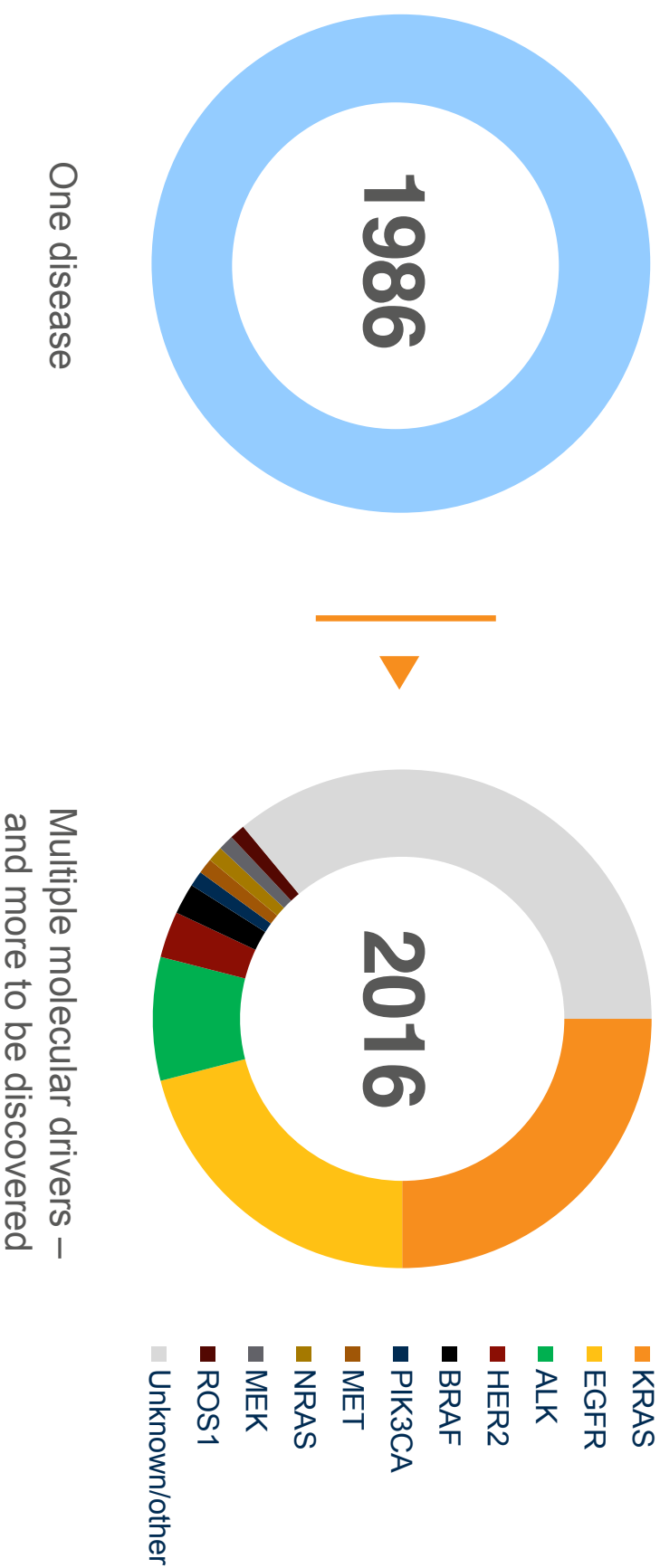|	
90% of patients in NCI trials are **white** [3]	vs	**23%** of the US POPULATION Is non-white [3]

…than clinical trial patients.

1. Lewis JH, et al. Participation of patients 65 years of age or older in cancer clinical trials. *J Clin Oncol.* 2003;21:1383-1389. http://jco.ascopubs.org/content/21/7/1383.full.pdf.
2. Mitchell AP, et al. Clinical trial subjects compared to "real world" patients: generalizability of renal cell carcinoma trials. *J Clin Oncol.* 2014;32(suppl):6510.
3. Taking action to diversify clinical cancer research. National Cancer Institute Web site. http://www.cancer.gov/ncicancerbulletin/051810/page7. Accessed July 23, 2014.

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Non-small cell lung cancer: from one cancer to many

1986

One disease

2016

Multiple molecular drivers –
and more to be discovered

- KRAS
- EGFR
- ALK
- HER2
- BRAF
- PIK3CA
- MET
- NRAS
- MEK
- ROS1
- Unknown/other

In the Age of Too Much Information…

Increase in clinical data relative to human cognitive capacity
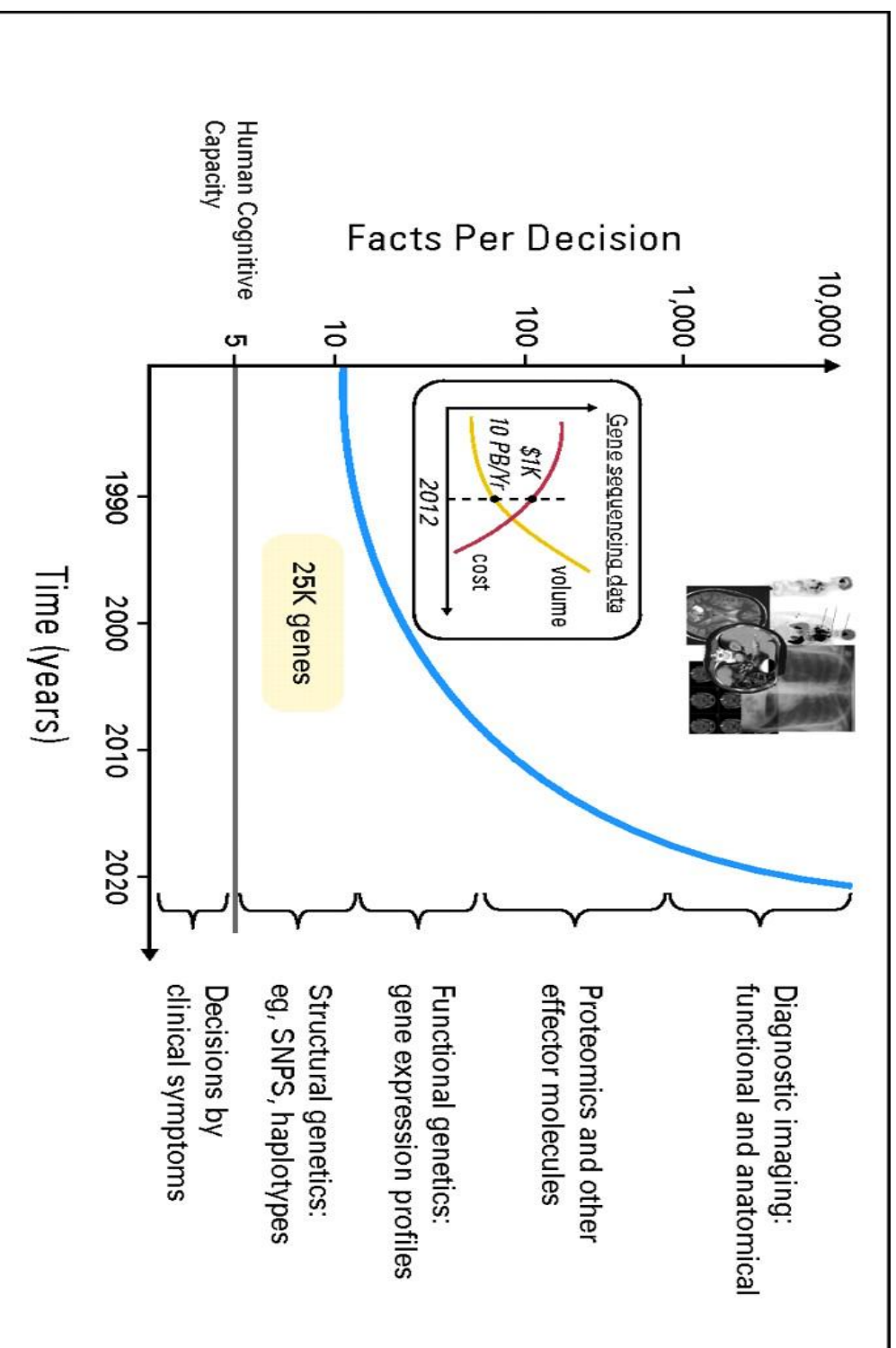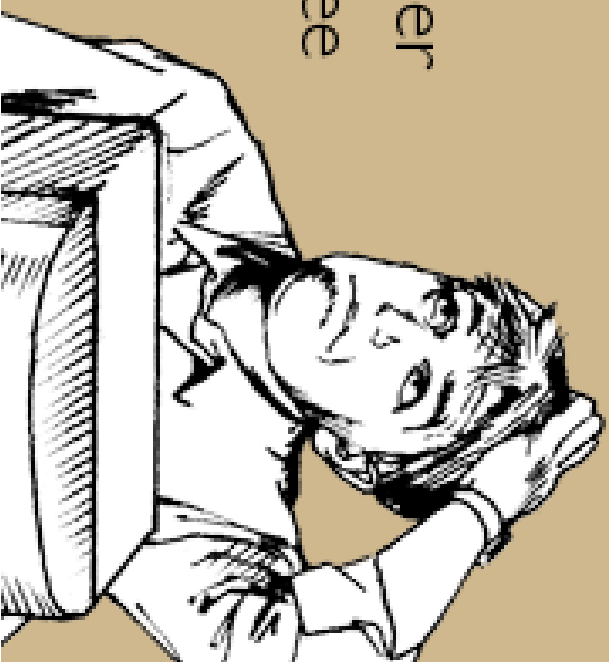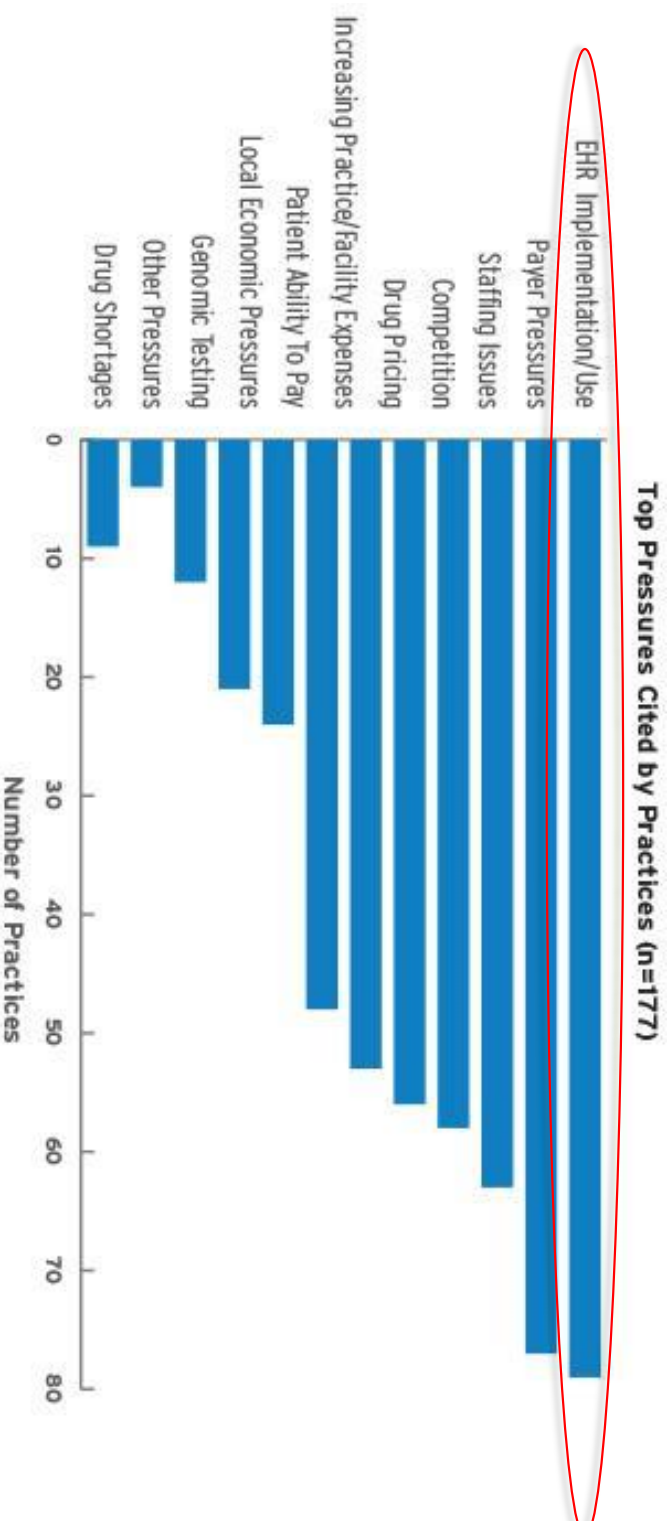
I have 5 pages of Documentation for her visit,

But I can't remember why she came to see me.

EHR Implementation: A Top Pressure Among Physicians

Top Pressures Cited by Practices (n=177)

Chart categories (top to bottom): EHR Implementation/Use, Payer Pressures, Staffing Issues, Competition, Drug Pricing, Increasing Practice/Facility Expenses, Local Economic Pressures, Patient Ability To Pay, Genomic Testing, Other Pressures, Drug Shortages

X-axis: Number of Practices (0, 10, 20, 30, 40, 50, 60, 70, 80)

According to the 2015 ASCO National Census of Oncology Practices:

- Nearly half of doctors surveyed cited EHR implementation as a top practice pressure
- Only one third were satisfied with their EHR
- 40% said their EHR made it difficult to improve efficiency and productivity

Source: 2016 State of Cancer Care in America Report, Journal of Oncology Practice

Health IT and big data offer a new universe of possibilities

The Promise of a Rapid Learning Health System

"... a system in which science, informatics, incentives, and culture are aligned for continuous improvement and innovation—with best practices seamlessly embedded in the delivery process and new knowledge captured as a by-product of the delivery experience"
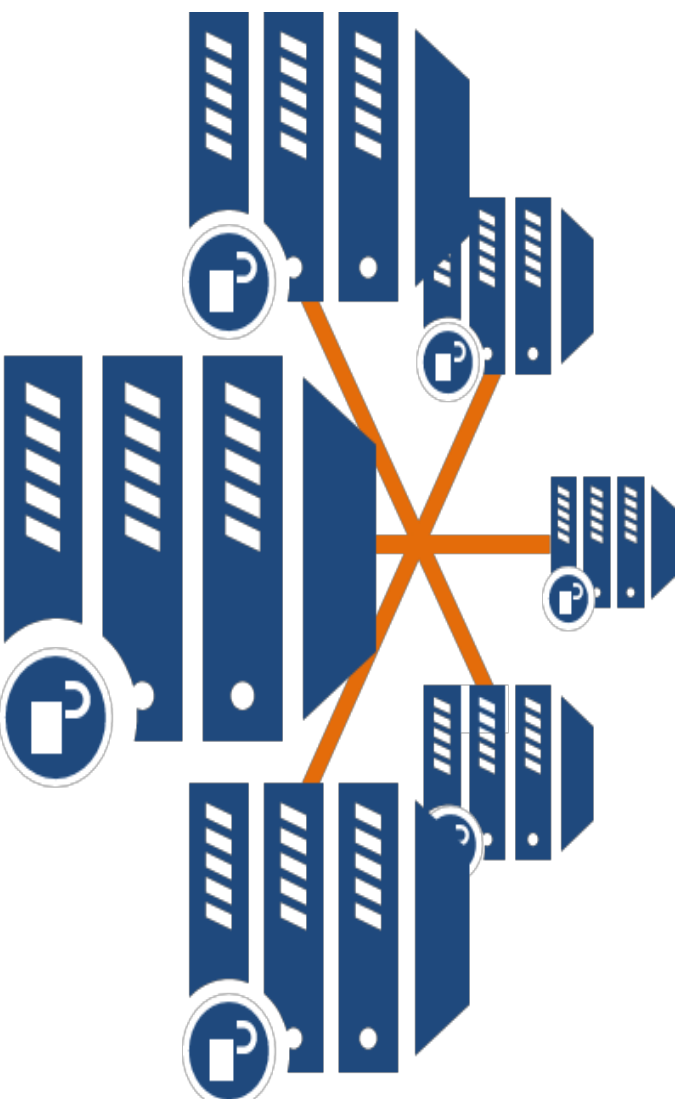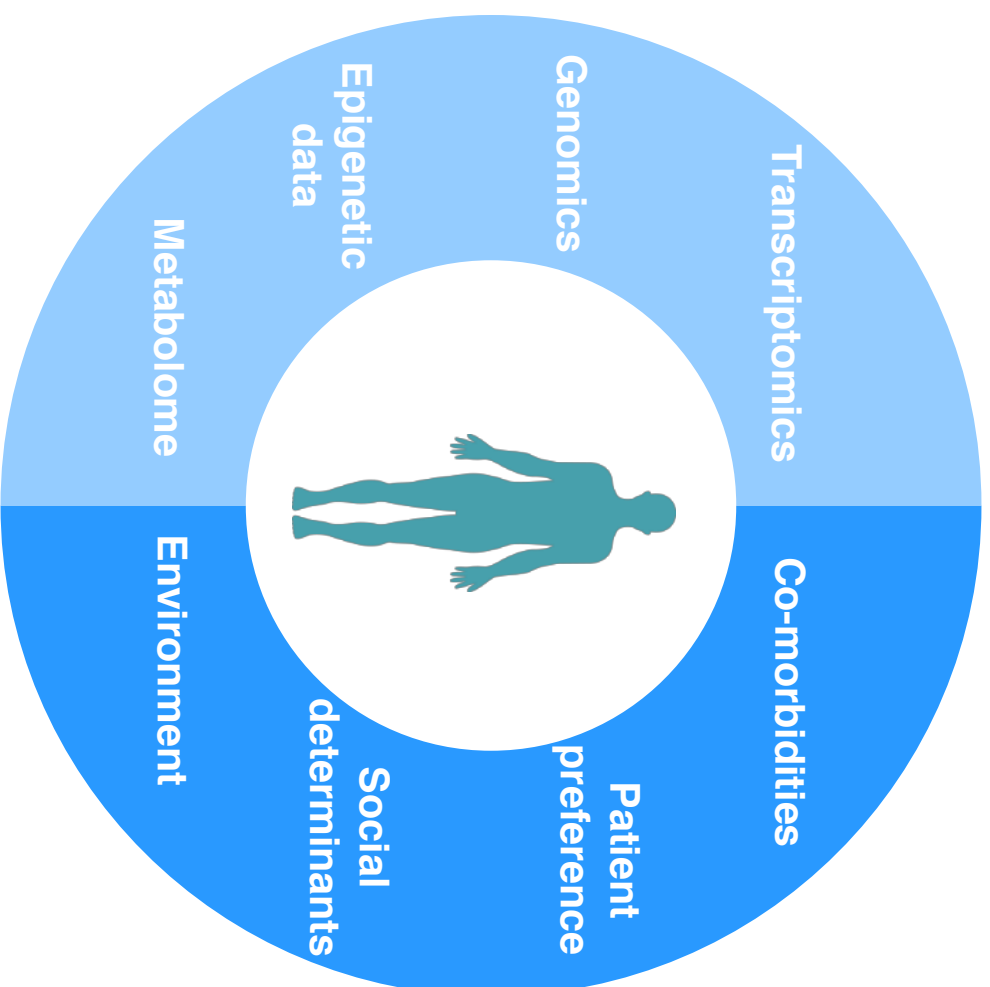
INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Best Care at Lower Cost: The Path to Continuously Learning Health Care in America – September 6, 2012

What If….

We could bring all the electronic data that is collected from the every day care of every cancer patient into one rapid learning network?

Integrated "-omic" & clinical data

"-OMIC"

CLINICAL

Epigenetic data

Genomics

Transcriptomics

Metabolome

Environment

Social determinants

Patient preference

Co-morbidities

ASCO's
CancerLinQ

ASCO logo

- Leading professional organization representing physicians caring for those with cancer

- 40,000 members from 100+ countries

- Mission: To conquer cancer through research, education, prevention, and delivery of high-quality patient care

ASCO CANCERLINQ logo

- Not-for-profit subsidiary of ASCO

- Dedicated staff and governing board

- Mission: Empowering the oncology community to improve quality of care and patient outcomes through transformational data analytics

SAP: Key Stats

#1
Enterprise software

$22.2B+
SAP revenue worldwide

261,000
customers in 190 countries

68,000+
employees worldwide

74%
world's transaction revenue

SAP Partnership

ASCO and SAP have engaged in a strategic technology partnership to develop and deploy the CancerLinQ platform

ASCO

- Overall development of CancerLinQ
- Control over the data, services, and products that stem from CancerLinQ
- Oncology subject matter expertise

SAP

- Access to SAP healthcare technical platform
- Customized tools unique to CancerLinQ's needs
- Engineering, development, and other technical support
- World class secure hosting facility

Measure and benchmark quality of care

Provide guidance by identifying the best evidence-based course of care

Unlock, assemble, and analyze de-identified cancer patient medical records

Uncover patterns to generate knowledge

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Learning Intelligence Network for Quality

How CancerLinQ Works

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1

Data from your practice are put into CancerLinQ via a daily feed that originates from source systems at your practice. There is no data entry required by practice team members.

2

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CancerLinQ ingests and processes the identifiable data at the individual patient level.

3

CancerLinQ uses statistical methodologies to de-identify data included in aggregate data sets.

4

Powerful data analytics tools, parameterized reports, and Quality Performance Indicators are made available to the practice and accessible via a standard Web browser via a secure Web connection.

CancerLinQ Functions & Capabilities

CancerLinQ Clinical User Portal

Key Functions & Capabilities

Quality performance indicators: real-time clinical quality metrics, prospective opportunities to improve performance

CancerLinQ Insights: valuable insights and trends from the aggregated, de-identified database

Visualized timeline: a longitudinal view of oncologic milestones in a patient's clinical event history, to construct a patient's story

Powerful analytic reports: suite of analytic reports for quick observations and insights of the practice patient population at a glance

CancerLinQ quality measures

Staging documented within one month of first office visit
Pain addressed by second office visit
Pain intensity quantified by second office visit
Test for HER2/neu overexpression or gene amplification
Tamoxifen or AI received within 1 year of diagnosis by patients with AJCC stage IA(T1c) and IB - III ER or PR positive breast cancer
CEA within 4 months of curative resection for colorectal cancer
Adjuvant chemotherapy received w/in 4 mos of diagnosis by patients w/ AJCC stage III colon cancer
Smoking status/tobacco use documented in past year
Rituximab administered when CD- antigen expression is negative or undocumented (Lower Score = better)
Hepatitis B virus infection test (HBsAg) and Hepatitis B core antibody (Anti-HBc) test within 3 months prior to initiation of rituximab for patients with NHL

Quality Performance Indicators

Categories

ALL MEASURES (10)

MY FAVORITES (0)

core (1)

Measures - ALL MEASURES

40% — HER2/neu Testing for Breast Cancer Patients
🕑 365 days   👤 227 of my patients

71% — Adjuvant Chemotherapy Received within 4 Months of Diagnosis for Stage III Colon Cancer
🕑 365 days   👤 7 of my patients

55% — Adjuvant Chemotherapy for Stage II-III Rectal Cancer
🕑 365 days   👤 12 of my patients

73% — Hormonal Therapy for Breast Cancer Patients within One Year of Diagnosis
🕑 365 days   👤 26 of my patients

82% — G-CSF not Administered to Patients who Received Chemotherapy for Metastatic Cancer
🕑 365 days   👤 57 of my patients

0% — Hepatitis B Testing Prior to Rituximab Administration for NHL
🕑 365 days   👤 30 of my patients

73% — Pain Assessment during First 2 Encounters
🕑 365 days   👤 1038 of my patients

70% — Pain Quantification Score during First 2 Encounters
🕑 365 days   👤 1038 of my patients

9% — Staging Documented within One Month of First Office Visit
🕑 365 days   👤 1082 of my patients

88% — Tobacco Use Assessment
🕑 365 days   👤 1084 of my patients

CancerLinQ Insights (CLQI)
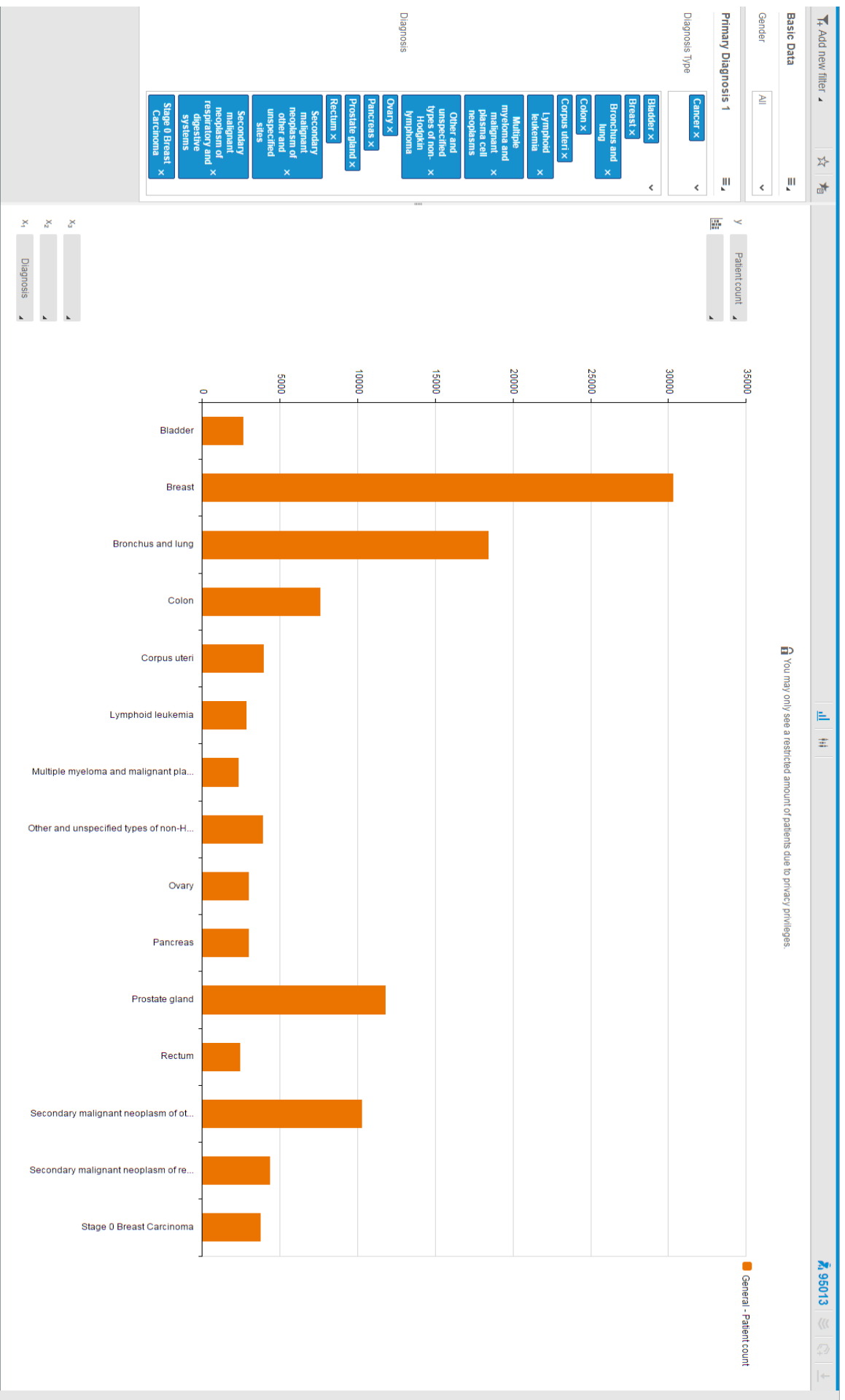
CancerLinQ is a voluntary resource for quality improvement and other health care operations. Patient care is always subject to the independent professional judgment of the treating physician.
CancerLinQ is not a patient medical record. For more information, visit CancerlinQ.org

↑

Patient Inspector

3
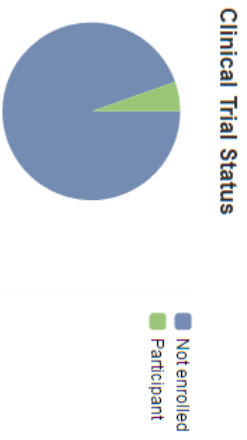DIAGNOSIS

0
TUMOR
CHARACTERISTICS

245
LABORATORY TESTS

13
ASSESSMENTS

6
TREATMENT PLAN

6
MEDICATIONS

6
TRIAL ENROLLMENT

45
ENCOUNTERS

3 Diagnosis
Primary Diagnosis, Primary Diagnosis, Primary Diagnosis

245 Laboratory Tests
Laboratory Tests, Laboratory Tests, Laboratory Tests, Laboratory
Tests, Laboratory Tests, Laboratory Tests, Laboratory Tests, Laboratory
Tests, Laboratory Tests, Laboratory Tests, Laboratory Tests,
Aug 24, 2015 - Apr 24, 2016

13 Assessments
Assessments, Assessments, Assessments, Assessments,
Assessments, Assessments, Assessments, Assessments,
Assessments, Assessments, Assessments, Assessments,
Aug 24, 2015 - Apr 24, 2016

6 Treatment Plan
Treatment Plan, Treatment Plan, Treatment Plan, Treatment Plan, Treatment Plan
Oct 25, 2015 - Oct 25, 2016

6 Medications
Administered Medication, Administered Medication,
Administered Medication, Administered Medication,
Dec 25, 2015 - Apr 24, 2016

6 Trial Enrollment
Clinical Trials, Clinical Trials, Clinical Trials, Clinical Trials, Clinical Trials, Clinical Trials
Dec 1, 2015 - Dec 1, 2016

45 Encounters
Encounter, Encounter, Encounter, Encounter, Encounter, Encounter,
Encounter, Encounter, Encounter, Encounter, Encounter, Encounter,
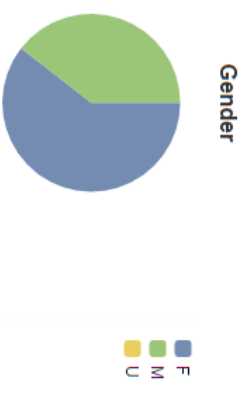Jul 25, 2015 - Apr 24, 2016

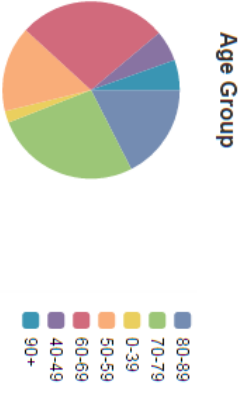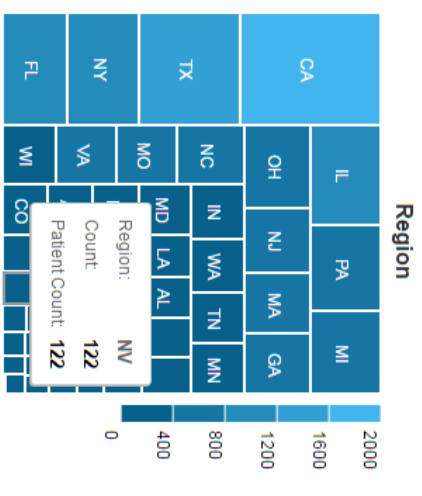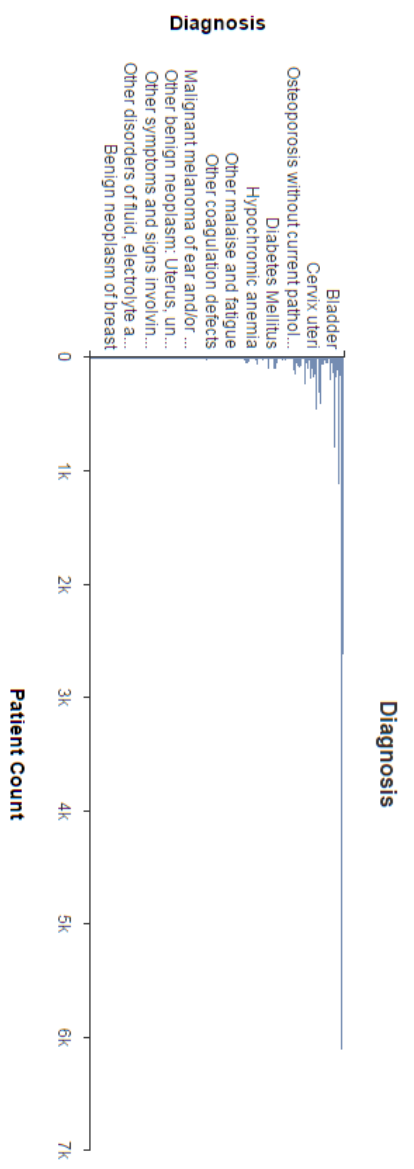Learning Intelligence Network for Quality

Data Analysis – Visualization Options

My Patients Case Mix
The distribution of characteristics in your patient population

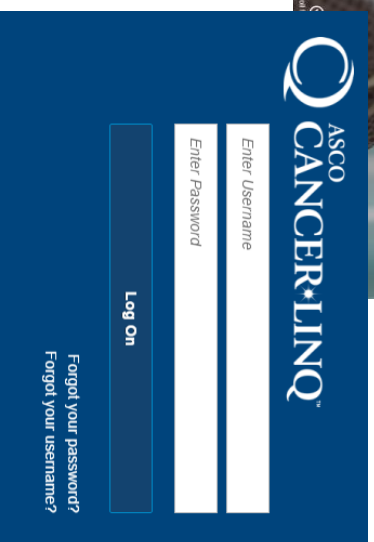**1029 patients** | Diagnosis(0), Age Group(0), Gender(0), Region(0), Clinial Trial Status(0)

Clear Filters | Search | Show Filter

Diagnosis

Bladder
Cervix uteri
Osteoporosis without current pathol...
Diabetes Mellitus
Hypochromic anemia
Other malaise and fatigue
Other coagulation defects
Malignant melanoma of ear and/or...
Other benign neoplasm: Uterus, un...
Other symptoms and signs involvin...
Other disorders of fluid, electrolyte a...
Benign neoplasm of breast

Patient Count: 0, 1k, 2k, 3k, 4k, 5k, 6k, 7k

Age Group
Legend: 80-89, 70-79, 0-39, 40-49, 60-69, 50-59, 90+

Gender
Legend: F, M, U

Region
FL, NY, TX, CA, WI, VA, MO, NC, OH, IL, CO, IN, NJ, PA, MD, WA, MA, MI, LA, TN, GA, AL, MN

Region: NV
Count: 122
Patient Count: 122

Scale: 0, 400, 800, 1200, 1600, 2000

Clinical Trial Status
Legend: Not enrolled, Participant

Accessing CancerLinQ

Today: via www.CancerLinq.org
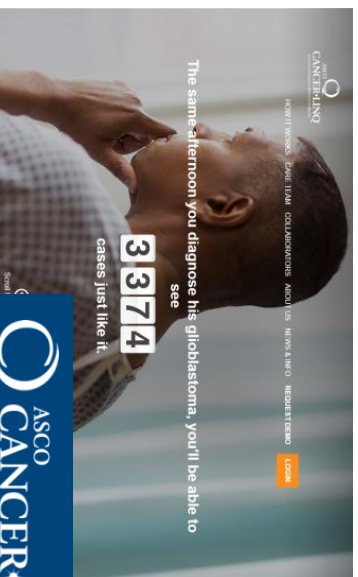
In the future: single sign-on support for participating institutions*
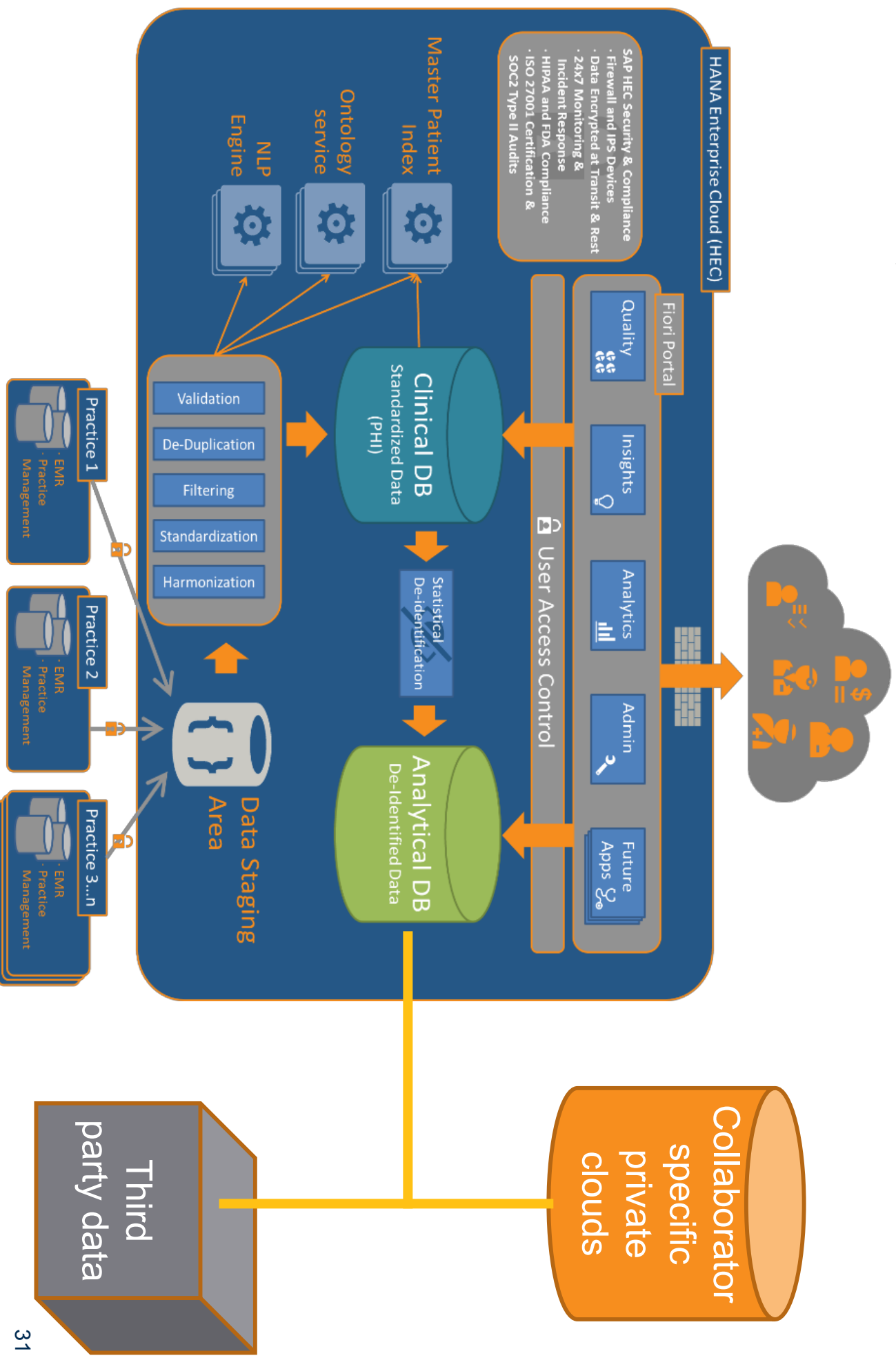

*For participating institutions who choose this option

DATA ARCHITECTURE & GOVERNANCE

CancerLinQ Data Architecture

Data Ingestion

CancerLinQ collects a broad range of clinical data about patients.

Patient Demographics	Care Plans
Provider Characteristics	Medications
Encounters	Radiology
Diagnosis	Radiation Therapy
Staging	Surgical Procedures
Pathology	Post-therapy Care and Surveillance
Physical Exams and Assessments	Notes and Documents
Laboratory Tests	

- Clinical data sent to CancerLinQ does include protected health information
- Unlike a registry, there is no fixed file format and data definition to adhere to
- Data ingestion involves both historical patient data and daily incrementals
- No manual data entry requirements for participating practices

Clinical Database
Protected health information

- Quality performance indicators – determine patients who require follow-up, intervention

- Visualize individual patient records in a manner not currently available in EHRs

Analytical Database
De-identified data

- Identify patterns that affect a subset of the population

- Generate new knowledge and insights

Board-appointed oversight committees

Compliance policies and procedures

Routine data quality assessments

Robust data request management process

Additional data sources (potential)

➤ Practice management system data

➤ Data warehouse extracts

➤ Registry data

➤ Genomic data

➤ Claims data

➤ International collaborations

**Stronger Together:
Sharing Knowledge Across Borders**

COALITION BUILDING|

POWERFUL NEW WAY TO

LEARN TOGETHER TO

IMPROVE PATIENT CARE

70+
practices/
cancer centers

14
EHRs
represented

~1500
oncologists on
board

>1,000,000
patient records

Bringing together the leading institutions in the field...

...to improve quality and care for all

Personalized.
Predictive.
Precise.
Powerful.
Patient-
Driven.
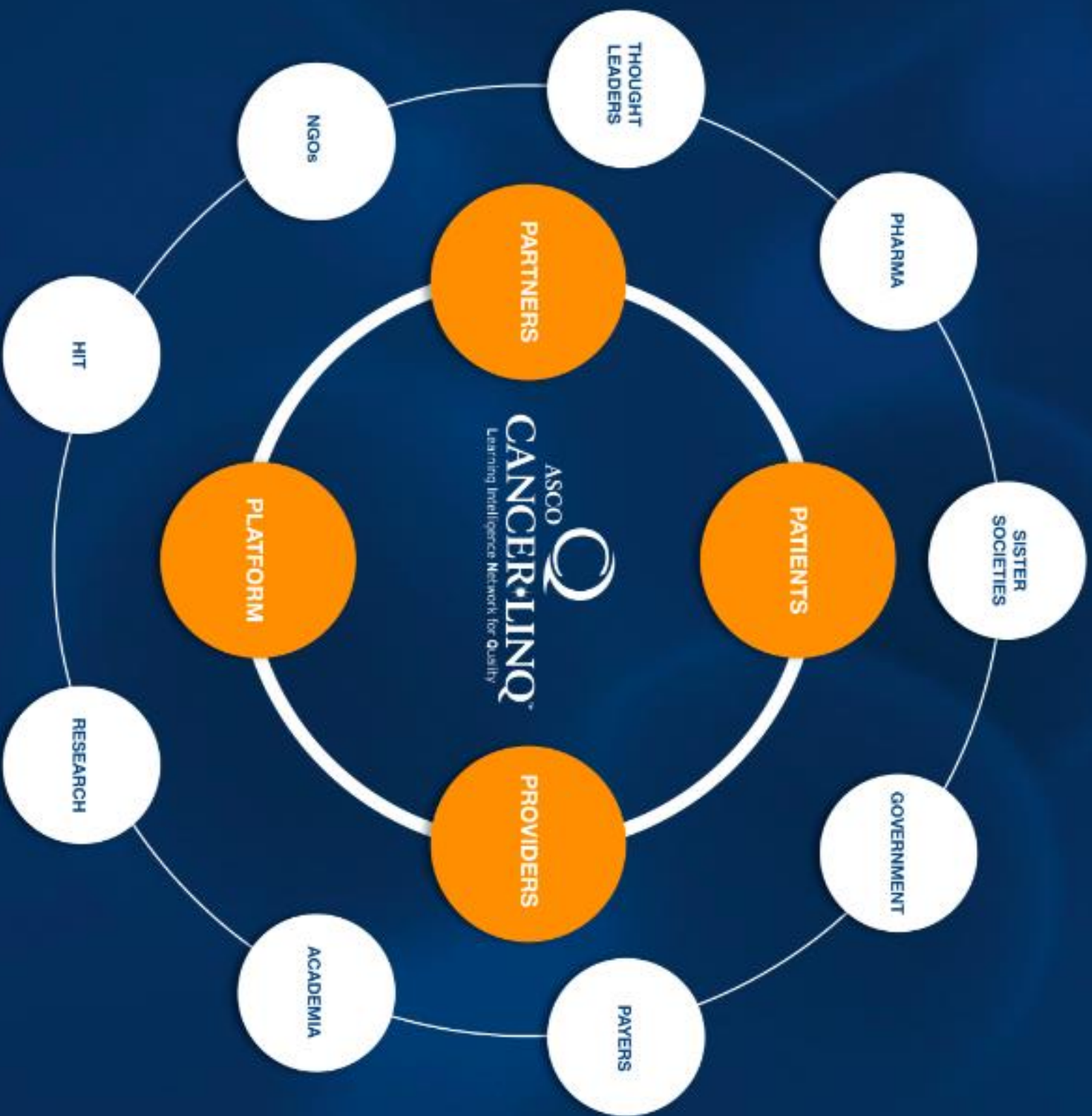
"CancerLinQ supports ASCO's mission to deliver quality care to a broad range of patients by rapidly extracting and learning from everyday records."

Clifford Hudis, MD, ASCO CEO

Jim Young/Reuters

"CancerLinQ needs to go faster."

VP Biden, ASCO 2016

Cancer Moonshot & Enhanced Data Sharing

"Tapping this treasure trove of information [data from tissue banks, patient registries, electronic medical records and other sources] is vital to speeding the pace of progress towards cancer cures."

- Vice President Biden, World Economic Forum, January 2016

Creation of an Open Access Resource

NIH
NATIONAL CANCER INSTITUTE
Genomic Data Commons

Select Non-Government Data Sharing Efforts

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PROJECTGENIE
Genomics Evidence Neoplasia Information Exchange

ORIEN
ONCOLOGY RESEARCH INFORMATION EXCHANGE NETWORK

synapse

Precision Medicine Exchange Consortium™

G-DOC plus®

Cancer Data Ecosystem

Genomic Data Networks

Translational Research Networks

Clinical Data Networks

Beneficiaries

Genomic Data

Clinical Data

Clinical Guidance & Services

Patient Data

UCSC
Genomic Institute

THE CANCER GENOME ATLAS

wellcome trust
sanger institute

BROAD INSTITUTE

PROJECT GENIE
Genomics Evidence Neoplasia Information Exchange

ORIEN

Global Alliance
for Genomics & Health

ClinGen
Clinical Genome Resource

ASCO CANCER LINQ
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Memorial Sloan Kettering
Cancer Alliance

ORI COLLABORATIVE CANCER CLOUD

IBM Watson Health

SAP

Data Contributors
- Patients
- Providers
- Payers
- Regulators
- Life sciences
- Researchers
- Molecular testing labs

43

1. Created by and for oncologists

2. On SAP's powerful, fast and secure data platform

3. Incorporating ASCO's leading practice guidelines and clinical quality measures derived from QOPI

4. And guided by ASCO's singular mission to improve patient care

ASCO
CANCERLINQ™
Learning Intelligence Network for Quality

CancerLinQ™ Major Supporters

Cancer Treatment Centers of America®
Winning the fight against cancer, every day.®

Pfizer Oncology

BAYER

Genentech
A Member of the Roche Group

HELSINN
Building quality cancer care together

susan G. komen®

Lilly | ONCOLOGY

NOVARTIS ONCOLOGY

Raj Mantena, RPh

AMGEN 35 YEARS®

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AstraZeneca

Boehringer Ingelheim Pharmaceuticals, Inc.

Thomas G. Roberts, Jr., MD, and Susan M. DaSilva

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CONQUER CANCER FOUNDATION
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Thank You