

Welcome to the Sentinel Innovation and Methods Seminar Series

The webinar will begin momentarily

Please visit www.sentinelinitiative.org for recordings of past sessions and details on upcoming webinars.

Note: closed-captioning for today's webinar will be available on the recording posted at the link above.



Imagine a world where
real-world caution becomes
real-world confidence.

Introducing...



ontada

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Measure what you treasure...

June 2021

Sarah A Alwardt, PhD
Vice President RWD/RWE
Ontada

Agenda

- Background and introduction to Ontada
- Real World Endpoints and challenges - how to evolve collection
 - Traditional
 - Contemporary
 - Future
- Thoughts for Sentinel

The oncology landscape continues to become more complex

Tailwinds



Molecularly-guided therapies



Greater connectivity of oncology ecosystem



Integration of real-world evidence



Value-based care



Headwinds

COVID-19 pandemic



Awareness of rapidly changing science



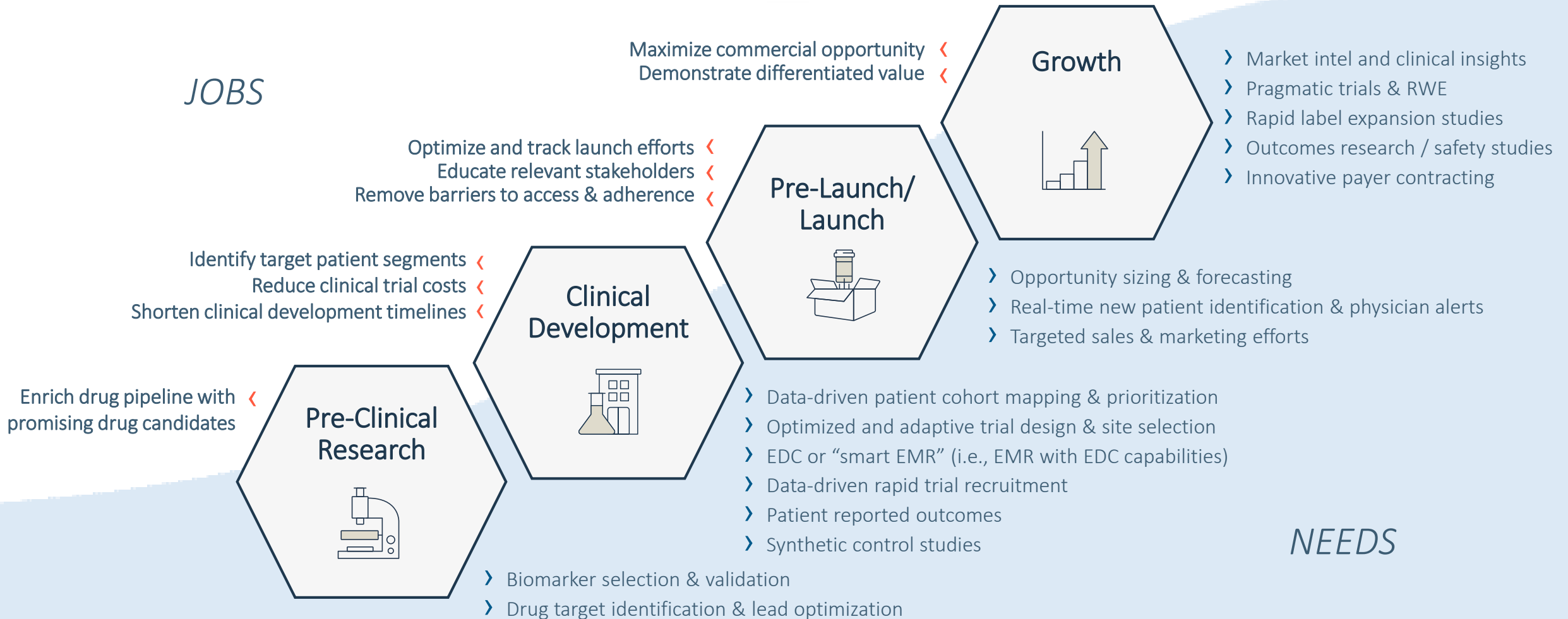
Maintaining workflow given complexity of care



Keeping the patient in the community



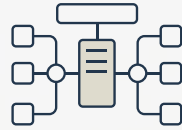
And at the same time, oncology life sciences companies have several key jobs-to-be-done



R&D teams are focused on finding and expediting promising new therapies for FDA approval



Manage R&D pipeline & product differentiation strategies



Develop clinical research protocols



Identify new clinico-genomic targets



Identify & validate potential companion diagnostics



Find the right patient for the right trial



Understand efficacy & side effects



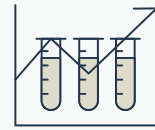
Gather evidence for regulatory approvals



Optimize clinical trial operations



Commercial teams are focused on maximizing treatment optimization



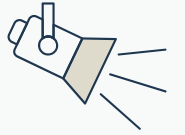
Understand
market size &
segmentation



Find the
right
patients



Educate
relevant
stakeholders



Demonstrate
differentiated
value



Identify
barriers
to access



Drive a
positive patient
experience

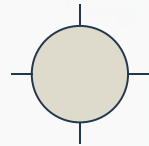


Expand into
new
indications

Medical & RWE teams are focused on understanding a therapy's effectiveness & safety in a real-world setting



Optimize relationships
and educate key
**thought leaders &
stakeholders**



Ensure
timely and relevant
**evidence &
insights**



Analyze
**disease burden
& unmet need**



Understand
**patterns of therapy &
optimal place in therapy**



Generate
**evidence of therapy
value**



We're here to help

ontada

Our vision

Transform the fight against cancer

How we'll
do it

Partner with life sciences and providers to advance technology and real-world insights across the oncology continuum

Commitment
to you

Deliver on the promise of real-world insights to drive innovation across the development lifecycle

It all starts with real-world data you can trust

Today our RWD and expertise are trusted to power key oncology research & decisions

Regulatory decision-making



RWD power numerous regulatory studies & the **first FDA approval** of a first-line therapy in oncology

Life sciences decision-making



RWD support a broad range of retrospective analyses & commercial insights

Provider decision-making



RWD power provider technologies that support evidence-driven decisions at the point-of-need

Published RWE studies



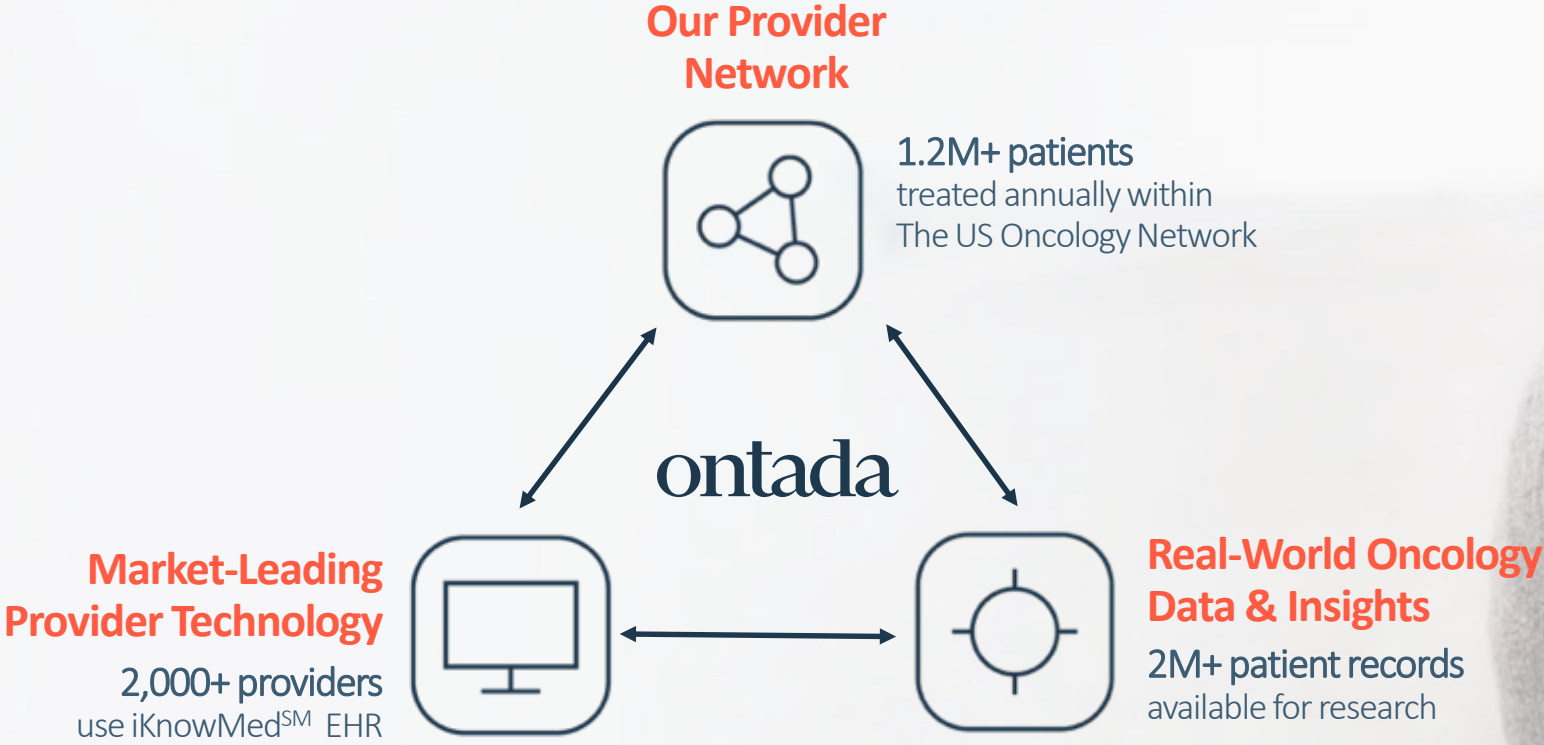
RWD used in **175+ RWE studies** in leading industry publications for 70+ oncology indications

New standards for real-world endpoints

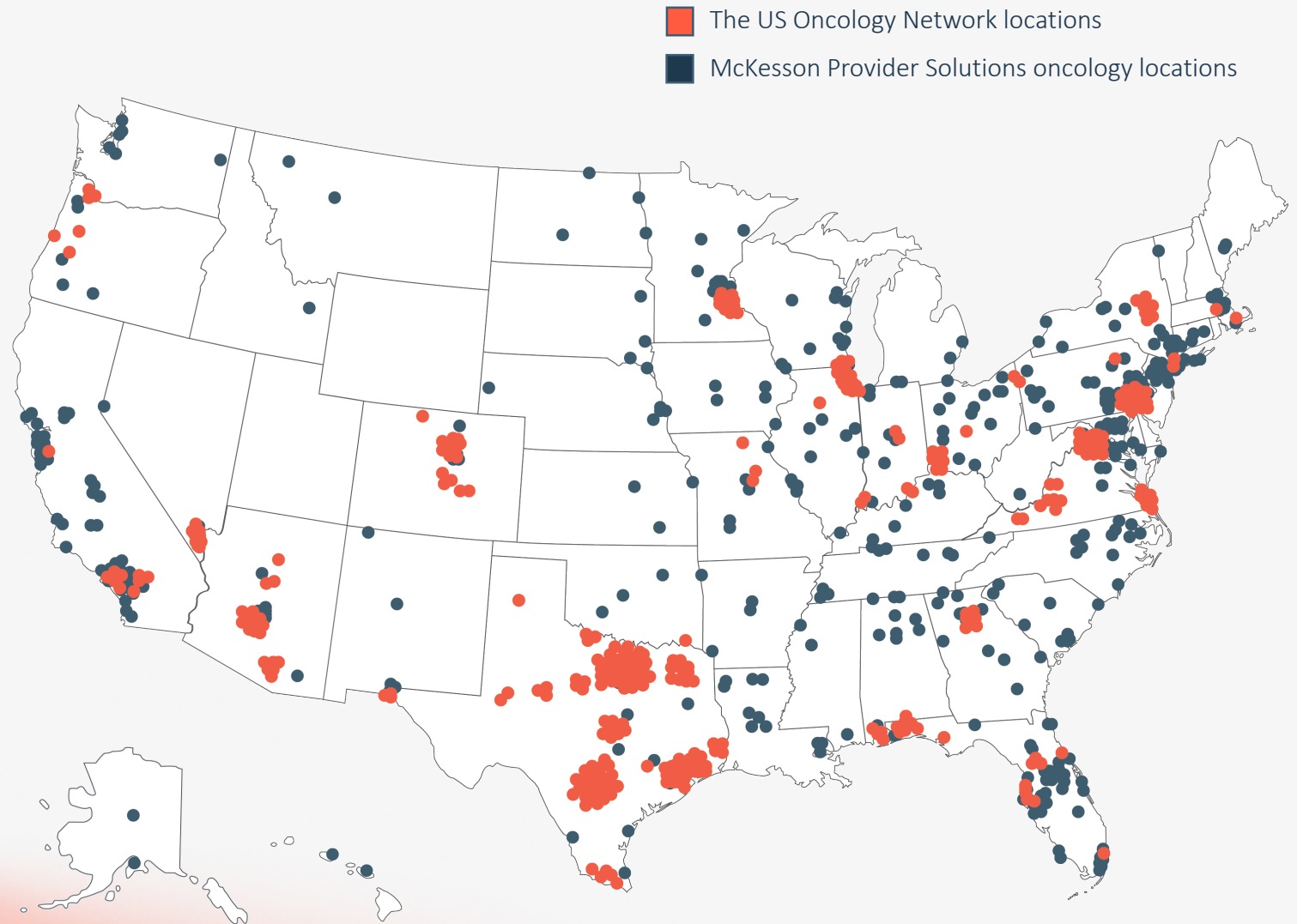


Ontada is helping define & standardize methodologies alongside life sciences & Friends of Cancer Research

We're uniquely positioned to advance cancer care by leveraging our interconnected technology & insights

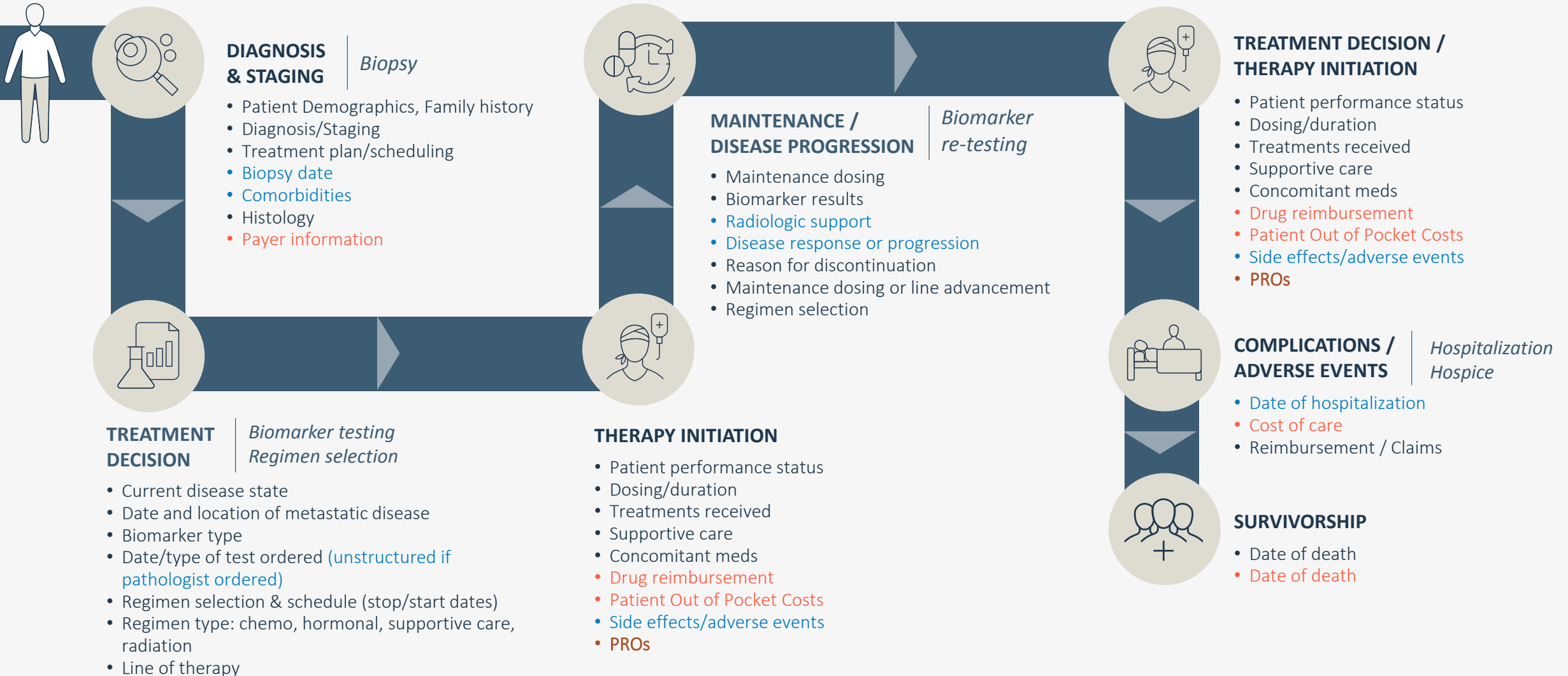


Our broad reach creates meaningful opportunities to engage with providers



Traditional Endpoints

Data enhancements on top of our structured clinical and genomic data elements give you the clearest view into the full patient journey



Our EHR supports providers in delivering the leading evidence-based care, while also capturing structured clinical data at the point-of-care



iKnowMed™ Generation 2 Search Patient Name or ID Onc Hem of MSH
East Bay Oncology - 02/11/2021

Faith's Dashboard **Lucia Moura (30 / F)**

Lucia Moura (30 / F) | DOB: 10/09/1990 MRN: 342423 Attending: Dyehouse, Karyn Dx: - Ht/Wt/BSA: - / - / - Allergies: Poloxamer

Chart Summary **Clinical Profile** Flowsheet Orders Results Documents Demographics Nursing Care Scheduler Admix Charge Capture

Problems Treatments Chart Alerts Care Plan Medications Allergies Health Maintenance Observations Family Hx OB/GYN Hx Devices **Problems Beta**

New Problem

Problem (required)	Breast cancer, female	Staging	Add a Stage	Location
Date of Diagnosis	01/11/2021	Stage Date	01/18/2021	<input type="radio"/> Left breast upper-inner quadrant
Status	Active	Ordinal	Primary	<input checked="" type="radio"/> Left breast upper-outer quadrant
Comment		Staging Type	Clinical	<input type="radio"/> Left breast lower-inner quadrant
Details	Stage Date : 01/18/2021, Ordinal : Primary, Staging Type : Clinical, Location : Left breast upper-outer quadrant	Location	Left breast upper-outer quadrant	<input type="radio"/> Left breast lower-outer quadrant
ICD-10	HCC C50.412 - Malignant neoplasm of upper-outer quadrant of left female breast	Tumor Type		<input type="radio"/> Left breast nipple and areola
		Node		<input type="radio"/> Left breast central portion
		Metastasis		<input type="radio"/> Left breast axillary tail
		Grade-Nottingham		<input type="radio"/> Left breast overlapping sites
		ER Status		<input type="radio"/> Left breast unspecified site
		PR Status		<input type="radio"/> Right breast upper-inner quadrant
				<input type="radio"/> Right breast upper-outer quadrant
				<input type="radio"/> Right breast lower-inner quadrant
				<input type="radio"/> Right breast lower-outer quadrant
				<input type="radio"/> Right breast nipple and areola

Our integrated clinical decision support tool helps providers to deliver on the promise of precision medicine



Edit Patient Problem

Histopathologic Type

- Squamous cell carcinoma
- Adenocarcinoma
- Adenocarcinoma, Minimally invasive
- Adenocarcinoma, Predominantly invasive
- Adenocarcinoma, Invasive
- Adenocarcinoma, Lepidic
- Adenocarcinoma in situ
- Adenosquamous carcinoma
- Bronchoalveolar carcinoma
- Large cell carcinoma
- Sarcomatoid carcinoma
- Neuroendocrine carcinoma
- Mixed cell type
- Other
- Unknown

Clear

ROS1 Gene

- Positive
- Negative
- Unknown

Clear

BRAF Mutation

- BRAF V600E (Mutated)
- Wild-type
- Mutations
- Unknown

Clear

PD-L1

- >= 50%
- 1-49% E
- Negative
- Unknown

Clear

EGFR Expression

- Positive-EGFR sensitizing mutation
- Positive-EGFR non-sensitizing mutation

Histologic Grade

- GX
- G1

Tumor Size (cm)

Residual Tu

- R0
- R1

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Clear Value Plus - Pathway Decision Support

Test1a Patient1a (50 / M)

MRN: test1a
DOB: 01/01/1970
Insurance:

✓ ALK (FISH):	Positive	EDIT
✓ BRAF Mutation:	Wild-type	EDIT
✓ EGFR Expression:	Negative	EDIT
✓ MET gene status:	MET negative	EDIT
✓ TRK gene:	Negative	EDIT
✓ PD-L1:	Negative	EDIT
✓ RET gene fusion status:	RET fusion negative	EDIT
✓ ROS1 Gene:	Negative	EDIT

Search All Regimens

✓ = Used by decision support

ontada | Confidential and proprietary

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New enhancements make it even easier for providers to select and order the right testing, supporting our growing precision medicine data set

Biomarker Lab Ordering Tool

POPPY FLOWER (43/F) DOB: 7 Jul 1977

Diagnosis: Breast Cancer ▲

Order initial path workup (HER2/ER/PR/Ki-67)

ORDER FORM

Order biomarker panel(s)

No tissue remaining (For Germline BRCA mutations (PARPi))

Refer to Genetic Counseling

Sufficient tissue for further testing

Early invasive breast cancer recurrence risk

Metastatic HER2 negative

Metastatic triple negative

ORDER FORM

FOUNDATION MEDICINE LIQUID

GUARDANT 360

ADDITIONAL INFO

Send comments or questions to: biomarker@mckesson.com

ORDER FORM

iKnowMed Data Points – Stage at Diagnosis

Stage at Diagnosis G1

TEST, PAUL
PATIENTID: 162464 DOB: 10/15/1944

Allegies / Adverse Reactions: None entered

Today: 06/20/2018

Decision Tools

TEST, PAUL

- Office visit
- Primary Hem/Onc Diagnosis for this visit: Lung Cancer, Non small cell
- Patient status alerts
 - 2017-2018 Flu vaccine is due
 - Pneumococcal vaccine is due
- Lung Cancer, Non small cell
 - Date of diagnosis: 05/08/2018, Age at diagnosis: 73
 - Tumor characteristics
 - TNM staging: T1c N1 M1b, Staging type: Patho...
 - Metastasis: Location: Lung, left
 - Node Positive Disease: Location: Lobar
 - Stage at diagnosis: IVA**
 - Location: Right main bronchus
 - Tumor genotype / phenotype
 - Histology
 - Histologic grade
 - EGFR mutation
 - ALK re-arrangement (FISH)
 - PD-L1
 - ROS1 gene
 - BRAF gene
 - Microsatellite instability (MS...)
 - Mismatch repair IHC
 - Karnofsky performance status *
 - Current status *
 - Pain care plan
 - Open problem list tool
 - In-house procedure document...
 - FH
 - Genetic counseling performed
 - Internal notes

Primary Hem/Onc Diagnosis for this visit: Breast

- Cardiovascular
- CNS
- Digestive System
- Endocrine/Metabolic
- Genitourinary
- Gynecologic
- Breast cancer, female
- Breast cancer, female, second primary
- Breast cancer, male
- Other Cancer
- Risk assessment, Cancer
- At risk for cancer

Save Note Discard Previous Next

Stage at Diagnosis G2

Edit Patient Problem

Female breast cancer

Minimum 3 characters required for Problem Search

ICD 10
C50.011 - Malignant neoplasm of nipple and areola, right te

Principal diagnosis

Status *	Date of Diagnosis	Resolution Date
Active		

Notes

Extent of Disease:

- Active surveillance
- Adjuvant
- Evidence of local disease
- Evidence of metastatic disease
- Unknown
- Other

Clear

Stage Date	Ordinal	Staging Type	Location	Tumor Type	Node	Metastasis	Stage	Stage At Dx
12/04/2017	Primary	Pathological	Left breast nip	T2	pN1	M1	IV	<input checked="" type="checkbox"/>

Add another Stage REMOVE

Disease State

- Initial diagnosis
- Stable disease
- Recurrent disease

Lymph Node Involvement

- Lymph nodes
- Axillary
- Brachial
- Bronchopulmonary

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iKM Data Points- Disease Status

Current Disease Status G1

ZZTEST, CINDY
PATIENTID: TR7777 DOB: 08/15/1975
Allergies / Adverse Reactions: NKA
Today: 08/20/2018

Office visit
Primary Hem/Onc Diagnosis for this visit: Colon Cancer

Colon Cancer
Office note
Date of diagnosis: 08/17/2016

Tumor characteristics
TNM staging: T1 N1a M1a, Staging type: Patho...
Node positive disease
Stage at Diagnosis: IIIA
Location: Transverse colon

Tumor genotype / phenotype
Status posttreatment
Residual tumor detail
Pregnant at diagnosis
Menopausal status
Karnofsky performance status
Current Status: Evidence of Metastatic disease

Preventive Care & Screening
Depression screening
Tobacco history
Flu vaccine status
Pneumonia vaccine status: Pneumococcal 23-valent
Colon cancer screening
Last mammogram

Primary Hem/Onc Diagnosis for this visit: Breast
Breast
Cardiovascular
CNS
Digestive System: Colon Cancer, Endocrine/Metabolic, Genitourinary, Gynecologic

Breast cancer, female
Breast cancer, female, second primary
Breast cancer, male
Other Cancer
Risk assessment, Cancer
At risk for cancer

Current Disease Status G2

Female breast cancer
Minimum 3 characters required for Problem Search

ICD 10
C50.011 - Malignant neoplasm of nipple and areola, right fe

Principal diagnosis
Status: Active
Date of Diagnosis
Resolution Date

Notes

Extent of Disease:
 Active surveillance
 Adjuvant
 Evidence of local disease
 Evidence of metastatic disease
 Unknown
Other

Clear

Stage Date	Ordinal	Staging Type	Location	Tumor Type	Node	Metastasis	Stage	Stage At Dx
12/04/2017	Primary	Pathological	Left breast nip	T2	pN1	M1	IV	<input checked="" type="checkbox"/>

Add another Stage

Disease State
 Initial diagnosis
 Stable disease
 Recurrent disease

Lymph Node Involvement
 Lymph nodes
 Axillary
 Brachial
 Bronchopulmonary

SAVE CANCEL

iKM Data Points – Line of Therapy

Line of Therapy G1

Order Regimen -- Webpage Dialog

16 type: Direct On Behalf Of This practice only All practices

16 Patient Information
 Diagnosis: Colon Cancer Stage: IVA
 Line of Therapy: Current Status:
 Height - in (new): Weight - lbs (new): BSA - m2: Dubois Recalc doses

Regimen: Fluorouracil (Solus + CIV) + Oxaliplatin (FOLFIRI 8, Modified)

Give	Order	Dose	Calc. Dose	Schedule	Instructions
<input checked="" type="checkbox"/>	IV access				
<input checked="" type="checkbox"/>	Regimen Instructions			D1	
CHEMOTHERAPY Add New					
<input checked="" type="checkbox"/>	Oxaliplatin, Inj	85 Mg/M2 IVPB as directed		D1	Mix in 250 mL D5W. Not compatible with NS. Oxaliplatin is an irritant.
<input checked="" type="checkbox"/>	Leucovorin calcium, Inj	400 Mg/M2 IVPB as directed		D1	Mix in 250 mL NS or D5W.
<input type="checkbox"/>	Levoleucovorin calcium, Inj	200 Mg/M2 IVPB as directed		D1	Mix in NS or D5W. May be diluted to concentrations of 0.5 mg/mL to 5 mg/mL. Total dose equals 50% of leucovorin dose. Refer to drug stability guidelines for agent.
<input checked="" type="checkbox"/>	Fluorouracil, Inj	400 Mg/M2 IV Push as directed		D1	
<input checked="" type="checkbox"/>	Fluorouracil CIV, Inj	2400 Mg/m2 over 46 hrs CIV as directed		D1	TOTAL CIV CYCLE DOSE = 2400 mg/m2 CIV over 46 hours. Patient to be seen for a pump disconnect on Day 3. Refer to drug stability guidelines.
PREMEDICATIONS Add New					
<input checked="" type="checkbox"/>	Palonosetron hcl, Inj	0.25 mg as directed I.V.		D1	
<input type="checkbox"/>	Granisetron hcl, Inj	1000 mcg as directed I.V.		D1	
<input type="checkbox"/>	Granisetron hcl, po solid	2 mg PO Daily (Tablet(s))		D1	
<input checked="" type="checkbox"/>	Granisetron hcl, po solid	2 mg PO Daily PRN (Tablet(s))		Rx	
<input type="checkbox"/>	Granisetron, top	1 Patch Topical as directed (Patch(es))		Rx	24 hours before chemotherapy. Dosing not to exceed 7 days.

Line of Therapy G2

Clear Value Plus - Pathway Decision Support required

Possey Flower (43 / F) Clear Value Plus SM Powered by NCCN

Line of Therapy: Show Definitions

Filter Chemotherapies by: APPLY CLEAR

Value Pathways	NCCN	P&T Preferred	NCCN Category of Evidence	Febile Neutropenic Risk	Emetogenic Risk	Action
Value Pathways	NCCN	P&T Preferred	NCCN Category of Evidence	Febile Neutropenic Risk	Emetogenic Risk	Action
Value Pathways	NCCN	P&T Preferred	NCCN Category of Evidence	Febile Neutropenic Risk	Emetogenic Risk	Action

LINE OF THERAPY
 1st Line Metastatic or Recurrent
 2nd Line Metastatic
 3rd Line Metastatic
 4th Line Metastatic
 5th Line Metastatic
 6th Line Metastatic
 7th Line Metastatic
 8th Line Metastatic
 9th Line Metastatic
 10th Line Metastatic

Regimen Type
 Regimen Type

Other Factors
 Node: EDIT
 Metastasis: EDIT
 Ordinal: EDIT
 Location: Left breast nipple and areola EDIT

Diagnosis
 Primary Diagnosis: Malignant neoplasm of female breast (disorder)

Staging Information
 Tumor Type: T2 EDIT

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Challenges

- Date of death concordance
 - Presentation in March from Flatiron Health perfectly describes
 - We evaluated 102911 patients using structured data and a subset of 826 patients were using unstructured data¹.
 - Among patients with death dates reported by either structured data or DMF (n=36,941), 93.3% were captured by structured data, with DMF providing dates for an additional 6.7%.
 - Among patients with dates reported by both structured data and DMF (14.9%), concordance was 88.0%.
 - Among subset of patients with unstructured data (n=358), 99.4% of death dates were captured from structured and unstructured data, with DMF providing dates for an additional 0.6%. Death dates were reported by all three sources for 16.2% with concordance of 94.8%.
 - Work to do:
 - Loss to follow up
 - Condolence cards
 - Survivorship programs

Challenges

- Line of Therapy
 - Concordance of Clinical Vs. Algorithm Based Line of Therapy Determination in Lung Cancer²
 - 150 patients with SCLC, 148 initiated 1L by both structured and unstructured data (98.6% percentage-agreement); all reported the same regimen (100% percentage-agreement).
 - By algorithm and clinical inputs, 33 patients initiated 2L having identical regimens (kappa-statistic: 0.81, 95%CI: 0.69-0.92). There were 11 discordant patients for 2L: 1 and 10 patients by unstructured and structured data, respectively.
 - Of the 150 patients with NSCLC, 147 initiated 1L by both structured and unstructured data (98% percentage-agreement); 135/147 reported the same regimen (91.8% percentage-agreement).
 - By algorithm and clinical inputs, 29 patients initiated 2L having identical regimens (kappa-statistic: 0.56, 95%CI: 0.42-0.70). There were 27 discordant patients for 2L: 4 and 23 patients by unstructured and structured data, respectively.
 - Work to do:
 - Data source matters
 - Doctors are people too

Contemporary Endpoints

iKM Data Points – Performance Status


Performance Status G1

The screenshot displays a medical software interface with a left-hand navigation pane and a main content area. The navigation pane includes sections like 'Progress Note', 'Details of illness', and 'History and physical'. The main content area is titled 'Ovarian epithelial cancer Completed treatment details' and features a 'Surgery' section with a list of procedures, including 'TAH, BSO, omentectomy (h/o)'. A 'Text Entry' section at the bottom contains a text area and a 'iKnowMed Dictation' button.

Performance Status G2

Add Performance Status


required

Observation Date :* 10/01/2020 Scale :* **Select One...** 

- Select One...
- ECOG
- Karnofsky

Add Performance Status

required

Observation Date :* 10/01/2020 Scale :* **ECOG** 

- 0 Normal activity. Fully active, able to carry on all pre-disease performance without restriction.
- 1 Symptoms, but ambulatory. Restricted in physically strenuous activity, but ambulatory and able to carry out work of a light or sedentary nature (e.g., light housework, office work).
- 2 In bed <50% of the time. Ambulatory and capable of all self-care, but unable to carry out any work activities. Up and about more than 50% of waking hours.
- 3 In bed >50% of the time. Capable of only limited self-care, confined to bed or chair more than 50% of waking hours.
- 4 100% bedridden. Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair.
- 5 Dead.

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iKM Data Points - Pain

Pain G1

Nurse Note *
Patient status alerts
Primary Charting
Clinic note
Anticoagulation program note
Patient assessment
Pregnant at diagnosis
Menopausal status Postmenopausal
Karnofsky performance status 90% - Able to carry on normal ac...
NCI toxicities
Edmonton Symptom Assessme...
Nursing procedures
Patient education
Discharge note
Other Charting
Incident to
Phone note
Message
Vital signs *
Weight
Height 67 in (170 cm)
Blood pressure
Pulse
Respiration
Temperature
Sequential vital signs
Orthostatic vital signs
Pain scale (0-10)
O2 sat
IVCS Vital sign d meds

Pain scale (0-10)
Best since last visit
Service History
Prior Observations
My Preferences

Pain scale (0-10)
Current 4;; remove
Best since last visit
Worst since last visit

0: No pain
 1:
 2:
 3:
 4:
 5:

Text Entry
iKnewMed Dictation

Save Note Discard
Previous Next

Pain G2

Daily Vitals for 10/01/2020 - (F, DOB: 07/07/1977, ID: zzflowerposey) required

Height (in): BSA: m² (DuBois And DuBois)
Last height 64 in on 11/19/2018
use last value

Temperature (F): + Add comment

Pulse (BPM): + Add comment

Respirations (min): + Add comment

Blood Pressure (mm Hg): + Add comment

Pain Scale: + Add comment

0-No pain
1
2
3
4
5
6
7
8
9

iKM Data Points - Depression

Depression G1

Depression screening

Depression screen

Service History
Prior Observations
My Preferences

Depression screening
Depression screen
Depression screen outcome

Depression screening : Yes

Screening tool used

Service History
Prior Observations
My Preferences

Yes
Screening tool used

Yes: adult
 Yes: adolescent
 4

Beck Depression Inventory (BDI)
 Center for Epidemiologic Studies Depression Scale (CES-D)
 Cornell Scale Screening
 Depression Scale (DEPS)
 Duke Anxiety-Depression Scale (DADS)
 Geriatric Depression Scale (GDS)
 Patient Health Questionnaire (PHQ-9)
 PRIME MD-PHQ2
 Other

5

Depression G2

Edit Depression Status * required

Observation Date: 09/28/2020

Patient was screened for depression?
 Yes Screening tool used: Patient Health Questionnaire (PHQ9)
 No Reason: Select

Outcome positive (patient is depressed)?
 Yes
 No

Total Depression Score: 20

Plan:

Additional evaluation for depression
 Suicide Risk Assessment
 Referral to a practitioner who is qualified to diagnose and treat depression
 Pharmacological interventions
 Other interventions or follow-up for the diagnosis or treatment of depression
 Patient declined treatment

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Challenges

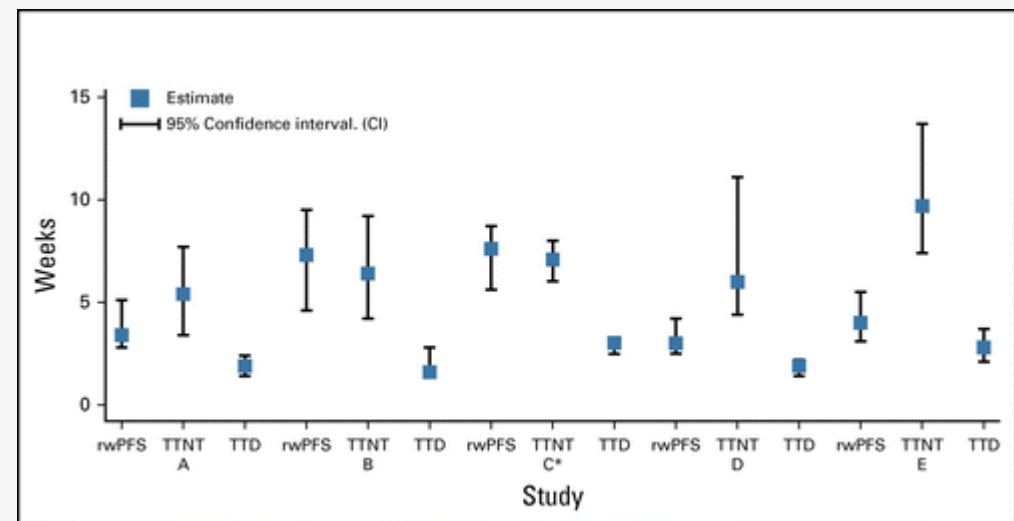
- Progression

- Comparisons of Real-World Time-to-Event End Points in Oncology Research³⁻⁵

- Across all studies, median TTD durations were shorter than median rwPFS and TTNT durations, with 95% CIs overlapping just once among the measures.
 - The 95% CIs for TTNT and rwPFS overlapped for three of the five studies, but the 95% CIs for TTNT were greater than rwPFS in the remaining two studies.
 - When expressed as point estimate ratios between surrogate measures and rwPFS, TTD or rwPFS ranged from 0.22 to 0.70 while TTNT or rwPFS ranged from 0.88 to 2.43. Additionally, the available samples to analyze TTD and TTNT were larger than for rwPFS.

- Work to do:

- Data source matters
 - Doctors are people too, again
 - RECIST in practice is not practical



Future Endpoints

We have access to lab and genomic test results in both structured and unstructured formats

Date of Birth: 00/00/0000 Case/Specimen ID: AA00-00000 A0 Turnaround: 3 business days
 PCDx Case#: PCDx-19-00000 Collection Site: Liver Tumor cells: 70%
 Physician: Dr. Smith Collection Date: 00/00/0000 Specimen size: 15 mm²
 Facility: Some Cancer Treatment Center Received for testing: 00/00/0000 Requirement met: Optimal

5 actionable genomic findings

- APC R232*
- APC E941*
- FANCA T1131A
- KRAS G12D
- TP53 P190L

6 IHCs

- HER2 Negative
- PDL1:TILs Negative
- PTEN Positive
- TRKpan Negative
- MGMT Negative
- PDL1:Tumor Negative
- TOPO1 Positive

Additional Findings: BRAF Wildtype, NRAS Wildtype, PIK3CA Wildtype

Immunotherapy TMB: Low (7 muts/mb)

6 therapies with potential increased benefit

Therapy	NCCN	TOPO1
Irinotecan*	NCCN	TOPO1
Regorafenib*	NCCN	KRAS, NRAS
Temozolomide*		MGMT
Binimetinib		KRAS
Carmustine		MGMT
Topotecan		TOPO1

* Indicates associations supported by the highest level of evidence

SUMMARY OF BIOMARKER RESULTS (SEE APPENDIX FOR FULL DETAILS)					
Biomarker	Method	Result	Biomarker	Method	Result
	NGS	Mutation Not Detected	KDR (VEGFR2)	NGS	Mutation Not Detected
	NGS	Quantity Not Sufficient	KRAS	NGS	Mutation Not Detected
	NGS	Mutation Not Detected	MGMT	IHC	Negative
	FISH	Negative	MPL	NGS	Mutation Not Detected
gen Receptor	IHC	Negative	NOTCH1	NGS	Mutation Not Detected
	NGS	Mutation Not Detected	NPM1	NGS	Mutation Not Detected
	NGS	Mutation Not Detected	NRAS	NGS	Mutation Not Detected
	NGS	Mutation Not Detected	PD-1 IHC	IHC	Negative
	NGS	Mutation Not Detected	PDGFRA	NGS	Mutation Not Detected
	NGS	Mutation Not Detected	PD-L1 IHC	IHC	Negative
	CISH	Test Not Performed	PGP	IHC	Negative
	IHC	Negative	PIK3CA	NGS	Mutation Not Detected
	NGS	Mutation Not Detected	PR	IHC	Negative
	NGS	Mutation Not Detected		NGS	Mutation Not Detected
	IHC	Positive		IHC	Positive
	NGS	Mutation Not Detected		NGS	Mutation Not Detected
	NGS	Mutation Not Detected		NGS	Mutation Not Detected
	NGS	Mutation Not Detected		NGS	Mutation Not Detected
	FISH	Negative		FISH	Negative
	IHC	Negative		IHC	Negative
	NGS	Mutation Not Detected		NGS	Mutation Not Detected
	NGS	Mutation Not Detected		NGS	Mutation Not Detected
	NGS	Quantity Not Sufficient		NGS	Quantity Not Sufficient
oclonal	IHC	Negative		IHC	Negative
clonal	IHC	Positive		IHC	Positive
	NGS	Quantity Not Sufficient		NGS	Quantity Not Sufficient

Summary of Somatic Alterations & Associated Treatment Options

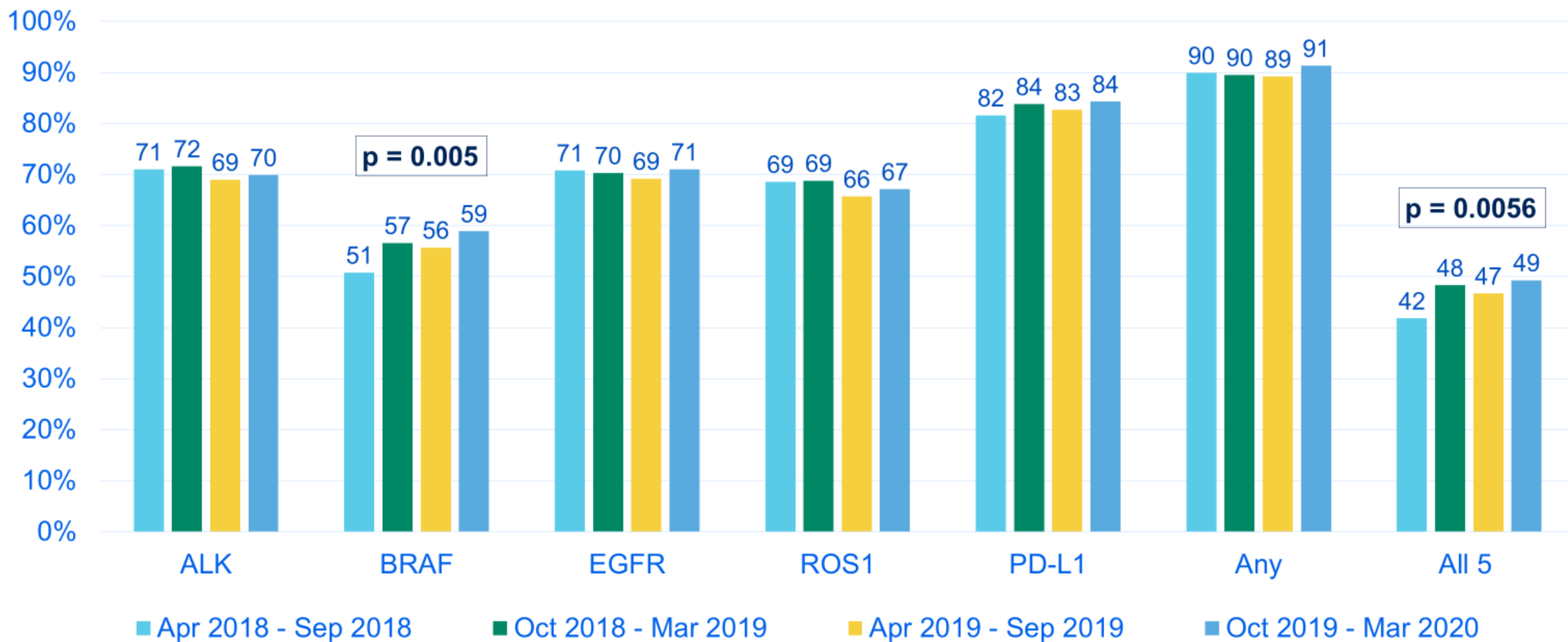
KEY: Approved in indication Approved in other indication Lack of response

Alteration	% cfDNA or Amplification	Associated FDA-approved therapies	Clinical trial availability (see page 3)
<i>EML4-ALK</i> Fusion	0.9%	<input checked="" type="checkbox"/> Crizotinib, Ceritinib, Alectinib	Yes
<i>PTEN</i> A333fs	0.2%	<input type="checkbox"/> Temozolimus, Everolimus	Yes
<i>MYC</i> Amplification	Medium (++)	None	Yes

Variants of Uncertain Significance
MAP2K1 G80C (1.4%), *EGFR* S246R (1.3%), *BRAC2* Q1507P (0.8%)
 The functional consequences and clinical significance of alterations are unknown. Relevance of therapies targeting these alterations is uncertain.

Synonymous Alterations
MET S286S (0.8%)
 This sequence change does not alter the amino acid at this position and is unlikely to be a therapeutic target. Clinical correlation is advised.

Biomarker testing rates over time



iKM Data Points – Genomic data

This real-world study showed that most patients received at least one biomarker test prior to 1L; however, <50% of patients received all 5 tests

- NGS testing increased over time, suggesting that comprehensive testing is increasing
- Median time from diagnosis to 1L therapy was about 5 weeks and turn around time from testing orders to results about 2 weeks.
- Results were similar for the overall study population and for patients with nonsquamous histology

Data from this phase will be compared to the next phase of the MYLUNG study, which will evaluate contemporary ordering practices and turnaround times prospectively.

iKM Data Points – Adverse Events

The screenshot displays the 'Add Adverse Event' modal form in the iKnowMed Generation 2 application. The form is overlaid on a background page showing performance status and a table of adverse events.

Form Fields:

- CTCAE Version:** Radio buttons for 5.0 (selected), 4.03, 4.0, and 3.0.
- Common Toxicities Quick Select:** Text input containing 'anxi' with a dropdown menu showing 'Anxiety'.
- Type:** Text input field.
- Grade:** Dropdown menu with '--Please Select--'.
- Onset Date:** Date input field.
- Resolution Date:** Date input field.
- Related to Study Drug:** Dropdown menu with '--Please Select--'.
- Most likely related to:** Dropdown menu with '--Please Select--'.
- Medication:** Text input field with a 'Search Orderables' button.
- Action taken:** Dropdown menu with options: '--Please Select--', 'Treatment held', 'Treatment terminated', 'Treatment dose reduced', 'Toxicity treated', and 'Patient education provided'.
- Comments:** Text area for notes.
- Buttons:** 'SAVE' and 'CANCEL' buttons at the bottom.

Background Table (Adverse Event):

Onset Date	Type
01/04/2017	(SAE) Dehydration

Measure what you treasure

You can't measure or analyze what was never collected

- People (doctors, patients, etc,) are responsible for the entry of these data

Do we need to rethink our most often used endpoints

- Patient-centric views
- What really matters

Broader industry adoption of methods and measurements

- Friends of Cancer
- ISPOR/ISPE

Thoughts for Sentinel

A few more thoughts

Data collection in the hands of the patient

- Real time symptom monitoring
- New patient reported outcomes (even better if patterned after those collected in trials)

Training

- Adverse events aren't what they used to be
- I/O therapy
- Cell and gene therapy

Thank You!

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Illustrative Example

NSCLC
EGFR-Positive

