ASCO Quality Training Program
Improving Time to Molecular Testing Results in Patients with Newly Diagnosed, Metastatic Non-Small Cell Lung Cancer (NSCLC)
6/18/2021
Kaiser Permanente Northern California: San Francisco

- We are part of an integrated network of 9000 physician practice, 130 oncologists, 21 cancer centers
- 4000 Employees
- 500 Physicians
- Hematology and Oncology
- Our department is part of the American College of Surgeon’s Commission on Cancer (CoC) Accreditation Program.
- It is also a program of the National Institutes of Health and an NCORP program.
Team members

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Hematology and Oncology Fellow, Second Year

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Director, Quality and Patient Safety Cancer Institute Hartford HealthCare
Team members

Additional Contributors:
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   Regional Pathology director
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   Medical oncologist, subspecializing in lung cancer

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   Director of the Division of Research (DOR)
Elaine Chung
   DOR Project lead STRATA
Chen Jiang
   DOR STRATA
Pamela Tse
   STRATA site coordinator
Problem Statement

Currently there are delays from diagnosis to next generation sequencing (NGS) results in patients with metastatic non-small cell lung cancer (NSCLC). At our institution, it takes a median of 24 days for patients with a pathological diagnosis to receive results of NGS, compared to 15 days recommended by ASCO and 10 days seen in the MYLUNG Consortium study. Specifically, delays in NGS results can lead to

- Increased patient fear and anxiety
- Inappropriate use of front-line therapies
- Increased mortality
## Outcome Measure

### Baseline data summary

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure:</strong></td>
<td>Time from pathological diagnosis to NGS results</td>
</tr>
</tbody>
</table>
| **Patient population:**  
  *(Exclusions, if any)*                    | Untreated, newly diagnosed patients with stage IV NSCLC                                                                                     |
| **Calculation methodology:**  
  *(i.e. numerator & denominator)*        | Median number of days to NGS results for patients with newly diagnosed metastatic NSCLC.                                                     |
| **Data source:**                         | EMR Chart review of dates regarding time to treatment                                                                                       |
| **Data collection frequency:**           | 26 patients with newly diagnosed NSCLC were reviewed from 12/2018 to 9/2020.                                                                   |
| **Data limitations:**  
  *(if applicable)*                        | One patient diagnosed with simultaneous glioblastoma and metastatic NSCLC, excluded from preliminary data set.                                |
Outcome Measure
Baseline data

Time from Pathology Results to Next Generation Sequencing Results in Patients with Newly Diagnosed Metastatic Non-Small Cell Lung Cancer from 12/2018 to 9/2020

Median = 24
Goal
Aim Statement

By June 1, 2021, we aim to reduce time from pathological diagnosis to NGS results for newly diagnosed patients with metastatic non-small cell lung cancer by 5 days, reducing time to NGS results to 19 days.
Process Map

- Steps in the Process
  - Oncology
  - Pathology
  - Division of Research
  - STRATA (NGS vendor)
- Number of Handoffs: 8
- Surprises: NGS process could be more efficient. Timing of sample delivery to NGS vendor effects process most. Inefficiency also stems from frequent handoffs of data.
Pathology and Division of Research Flow Diagram

Econsult sent

- DOR process STRATA portal
  - Path processes STRATA portal timely?
    - Yes: Path finishes STRATA portal
    - No: Delays: non-oncologist order, information missing, holidays

- Path obtains slides, verifies quantity, and ships to STRATA
  - Up to 10 days to be delivered

- STRATA testing performed and results returned
  - Yes: Data entered into DOR tracking system
  - No: See STRATA Flow Diagram

- DOR sends report to ordering MD
NGS: Next generation sequencing

day 0 = first imaging

Median time to full staging = 15.5d
Median time to eConsult = 17d
Median time to onc consult = 30.5d
Median time to NGS received = 32d
Median time to initial treatment = 47d

Median time to path = 12d
Median time to NGS order = 19d
Median time to PDL1 result = 31d
Median time to NGS report = 46d
Process Measure: Diagnostic Data

Median Time from Pathological Diagnosis to NGS Results in Patients with Newly Diagnosed Metastatic NSCLC from 12/2018 to 9/2020
### Priority / Pay-off Matrix

#### Countermeasures

<table>
<thead>
<tr>
<th>High Impact</th>
<th>Low Impact</th>
</tr>
</thead>
</table>
| • Copath automated report sent to oncology.  
  • Change regional econsult to include ordering oncologist and prioritization of STRATA over PDL1.  
  • Allow specimens to be accepted at STRATA Monday-Sunday  
  • IR to take additional core biopsies from patients suspected to have mNSCLC. | • Centralization of STRATA process to exclude local pathology.  
  • Pilot centralization of process for SFO Oncology first.  
  • Modify local econsult page to include ordering oncologist and prioritize STRATA over PDL1.  
  • Provide education to oncology and pathology departments to prioritize STRATA over PDL1. |

<table>
<thead>
<tr>
<th>Ease</th>
<th>Ease of Implementation</th>
<th>Difficult</th>
</tr>
</thead>
</table>
| High | • Changing econsult order to HealthConnect order.  
  • Send pathology block to STRATA. | • Centralization of STRATA process to exclude local pathology.  
  • Pilot centralization of process for SFO Oncology first. |
## Process Measure

### Diagnostic Data summary

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<td><strong>Calculation methodology:</strong></td>
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<td><em>(i.e. numerator &amp; denominator)</em></td>
<td></td>
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<tr>
<td><strong>Data source:</strong></td>
<td>EMR Chart review of dates regarding time to treatment</td>
</tr>
<tr>
<td><strong>Data collection frequency:</strong></td>
<td>11 patients with newly diagnosed NSCLC were reviewed from 11/2020 to 5/2021.</td>
</tr>
<tr>
<td><strong>Data limitations:</strong></td>
<td>Exclusion: patients who only received liquid NGS testing only; patients diagnosed through atypical means.</td>
</tr>
</tbody>
</table>
### Test of Change

#### PDSA Plan

<table>
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<th>Cycle</th>
<th>Date</th>
<th>PDSA Description</th>
<th>Result</th>
</tr>
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</table>
| 1     | 11/12/2020 | Interventional radiology began identifying (via econsult) suspected metastatic disease and obtaining additional tissue samples to allow for adequate tissue to be sent to STRATA and potentially allow for earlier next generation sequencing orders with the early identification of metastatic disease. | N= 11  
Median 19 days                                                                                   |
| 2     | 11/20/2020 | Copath, a division of the pathology department, generated weekly, automated reports to the oncology department. Oncology department determined newly diagnosed metastatic NSCLC patients and placed next generation sequencing orders. | Prospective cohort, n=11  
Reduction in time from biopsy results to NGS results by 5 days. Reduction in time from biopsy results to NGS order by 6 days. |
Median Time from Pathological Diagnosis to NGS Results in Patients with Newly Diagnosed Metastatic NSCLC from 11/2020 to 5/2021

- **NGS Report**: 13
- **Initial Oncology Visit**: 12
- **Oncology RN Navigator Visit**: 6
- **PDL 1 Report**: 4
- **Oncology Electronic Referral**: 4
- **NGS Order**: 1

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KNOWLEDGE CONQUERS CANCER

Quality Training Program
## Test of Change

### PDSA Plan

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<tr>
<td>3</td>
<td>1/2021</td>
<td>Education to the pathology and oncology departments to prioritize STRATA over PDL1</td>
<td>Not all patients had prioritization of STRATA over PDL1 with education alone, but PDSA cycle 4 aimed to achieve this same goal.</td>
</tr>
<tr>
<td>4</td>
<td>5/2021</td>
<td>E-consult updated to simply ordering of tissue NGS for physicians. Prioritization of STRATA over PDL1 explicitly stated.</td>
<td>Solidified implementation of prioritization of STRATA over PDL1.</td>
</tr>
<tr>
<td>5</td>
<td>5/2021</td>
<td>New Tissue NGS order integrated into Epic.</td>
<td>Caused unexpected delays as the division of research was unable to appropriately pull information needed to process each STRATA order.</td>
</tr>
</tbody>
</table>
Balancing Measures

- Ordering PDL-1 before tissue NGS can cause delays to specimens' transport to our NGS company.
- Implementing a new EMR order for tissue NGS can cause delays to department processing of this order.
- We are still collating data for these balancing measures.
## Test of Change

### Future PDSA Plans

<table>
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<th>PDSA Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>7/2021</td>
<td>STRATA accepting specimens every day.</td>
<td>This will allow pathology to send specimens out on Thursdays and Fridays and avoid 2-4 days delay due to weekend and holiday delays.</td>
</tr>
<tr>
<td>7</td>
<td>9/2021</td>
<td>Regionalization of pathology sending specimen directly to STRATA</td>
<td>This will reduce time to NGS results by 1-2 days, by eliminating a handoff between local and regional pathology labs.</td>
</tr>
</tbody>
</table>
Outcome Measure: Change Data

Time from Pathology Results to Next Generation Sequencing Results in Patients with Newly Diagnosed Metastatic Non-Small Cell Lung Cancer from 12/2018 to 5/2021

Intervention #2

Outcome Measure:

Pre intervention average = 28 days; Post intervention average = 18 days
### Next steps Sustainability Plan

<table>
<thead>
<tr>
<th>Next Steps</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN Manager review copath report weekly and check in with fellows monthly.</td>
<td>Fellow and RN</td>
</tr>
<tr>
<td>Fellow will monitor process and outcome measures weekly.</td>
<td>Fellow</td>
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Conclusion and Lessons Learned

• Improved interdepartmental communication allowed for increased efficiency.
• Using technology to automate processes reduced turn around time.
• Parallel processing, when possible, can lead to expedited, improved outcomes.
• Inviting key stakeholders to the table was critical and possible!
Improving Time to Molecular Testing Results in Patients with Newly Diagnosed, Metastatic Non-Small Cell Lung Cancer (NSCLC)

AIM: By June 1, 2021, we aim to reduce time from pathological diagnosis to NGS results for newly diagnosed patients with metastatic non-small cell lung cancer by 5 days, reducing time to NGS results to 19 days.

INTERVENTION: We reviewed process maps for oncology, pathology, the internal data management division, and a genomic testing company to determine factors leading to significant preventable delays. Since 11/2020, we created an automated weekly report using CoPath to identify new pathological diagnoses of potential metastatic NSCLC. The oncology department reviewed these cases weekly and NGS orders were placed for patients with metastatic NSCLC.

RESULTS: Delays in time to NGS results can be reduced by improved communication between departments and simple, automated interventions to ensure results are efficiently released to an oncologist.

CONCLUSIONS: Delays in time to NGS results can be reduced by improved communication between departments and simple, automated interventions to ensure results are efficiently released to an oncologist.

NEXT STEPS: Additional Plan-Do-Study-Act cycles are currently being developed to further reduce time from biopsy results to NGS results.