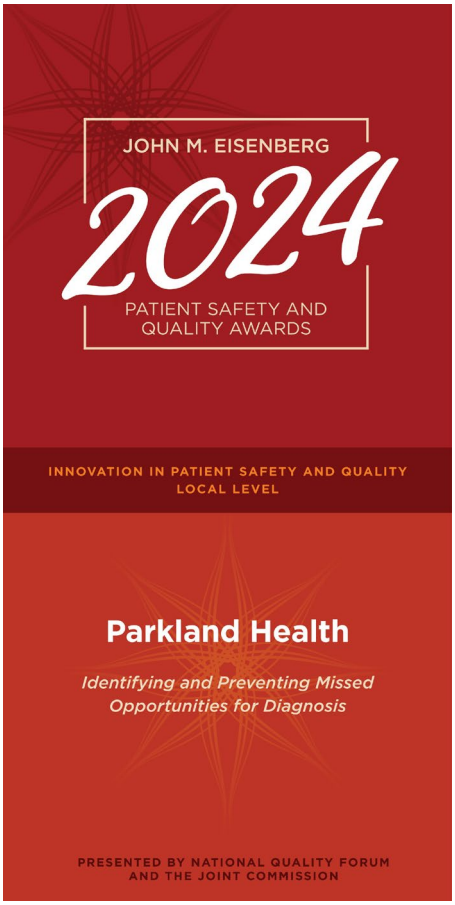

2024 Application Summary for John M. Eisenberg Patient Safety and Quality Award – Local Level Achievement

Parkland Health - Identifying and Preventing Missed Opportunities for Diagnosis

Executive Summary

Parkland Health is addressing missed opportunities for diagnosis, a critical patient safety concern affecting 12 million US adults annually, through an innovative Digital Health Center surveillance program. This comprehensive initiative manages high-risk diagnostic scenarios using a bilingual care team trained in motivational interviewing and barrier removal.

The program has demonstrated significant improvements in diagnostic follow-up completion. Annual interventions[1] increased nearly threefold from 290 (2018) to 827 (2022)[2], with overall completion rates ranging from 42% to 91%. Analysis[3,4] revealed 4.3% of cases resulted in cancer diagnoses, while 3.1% required immediate surgical intervention. Abnormal mammogram completion rates[6] improved from 83% to 90%, and tumor marker follow-up gaps[7] decreased from 15% to 11%. The cancer diagnosis program[8] improved follow-up rates from 48% to 75%.
Enhanced by AI technology (97.2% accuracy in testing), this scalable model shows how healthcare organizations can reduce diagnostic errors through proactive surveillance and comprehensive patient support. The program's tested approach and results offers healthcare systems a replicable framework, especially benefiting underserved communities.

Describe why the focus area for your initiative is/was important for patient safety and quality.

Diagnostic errors rank as the third leading cause of death in US healthcare, affecting 12 million adults annually with 600,000 to 1 million suffering permanent disability or death. Women and minorities face 20-30% higher rates of misdiagnosis, highlighting critical disparities in care quality. These missed opportunities for diagnosis (MODs) frequently occur during care transitions, particularly in ED visits and specialist referrals. Nearly 25% of ICU transfers or hospital deaths involve diagnostic delays or errors, often in time sensitive conditions like cancer where delayed detection significantly impacts survival. The financial and human costs are substantial. Beyond the immediate impact on patient outcomes, diagnostic errors account for the largest fraction of medical malpractice claims and create lasting psychological trauma for both patients and clinical teams. Healthcare organizations face increased costs from extended hospitalizations, additional treatments, and legal liability.

This focus area represents a crucial opportunity to prevent harm through systematic intervention, particularly for vulnerable populations who face the highest risks of diagnostic errors and experience the most severe consequences from delayed care.

Describe how the problem was identified within your setting/organization.

A tragic 2013 safety event[10] at Parkland Health revealed a critical system failure in diagnostic follow-up care. A 58-year-old ED patient's chest CT showed a concerning lung finding requiring 3-month follow-up. Despite multiple subsequent healthcare encounters, this recommendation was never

communicated to his primary care physician. When the patient returned 18 months later, he had developed widely metastatic disease and died within two months. This sentinel event prompted Parkland, a major safety-net hospital, to analyze its delayed imaging surveillance (DIS) processes. Initial data collection (July 2018-February 2019) revealed concerning metrics: among 601 DIS opportunities in 330 patients, only 42% were addressed within appropriate timeframes without intervention, while 17% were overdue with no orders or completion.

Further safety events uncovered additional diagnostic MOD opportunities, including missed follow-ups for abnormal mammograms in patients without PCPs and delayed evaluations of significantly abnormal tumor markers. These findings demonstrated a critical need for systematic diagnostic surveillance, particularly given our vulnerable patient population who face higher risks of care fragmentation.

Explain how the project/initiative was implemented.

Parkland implemented its Safety Net Surveillance (SNS) program through strategic phases, evolving from a basic monitoring system to a comprehensive diagnostic safety program. Following a 2013 sentinel event, the initial implementation began in 2018 with radiologists discretely flagging delayed imaging surveillance (DIS) MODs. Due to resource constraints, patient outreach was initially limited to email and postal communication by call center nurses during their spare time.

A pivotal transformation occurred in July 2022 with the Digital Health Center's creation. The SNS team introduced key innovations: dedicated bilingual staff trained in motivational interviewing, comprehensive social driver screening, social worker integration for barrier removal, proactive navigation and follow-up coordination, and a population management component was implemented within the EHR system.

The program expanded systematically to address six high-risk scenarios:
1. Delayed imaging surveillance findings (2018)
2. Abnormal tumor markers without specialist follow-up (2022)
3. Abnormal mammograms in patients without PCPs (2023)
4. Critical aortic aneurysm findings (2023)
5. Suspicious lung lesions requiring rapid evaluation (2023)
6. New cancer diagnoses lacking oncology follow-up (2024)

The team developed a structured workflow:
1. Patient identification through automated reports
2. Nurse review and risk assessment
3. Patient outreach and SDOH screening
4. Virtual physician order entry
5. Appointment coordination
6. Barrier assessment and mitigation
7. Follow-up tracking until completion

Challenges and Solutions:
• Resource Limitations: Overcame through centralization and dedicated staffing
• Departmental Capacity: Implemented direct scheduling pathways
• Patient Barriers: Integrated social work support and SDOH screening
• Care Coordination: Utilized EHR tools for population management
• Provider Communication: Added one-month buffer for ordering team intervention

Refinements included transitioning from reactive to proactive monitoring and implementing lean methods.

Success measures include completion rates and barrier documentation. Timeframes vary based on follow-up needs, scheduling capacity, and patient factors. The program demonstrates how structured implementation creates an effective system for managing diagnostic risks. Regular assessment enables continuous improvement.

Describe your achievements and improved state.

Parkland created a comprehensive safety net surveillance program that demonstrates sustained improvement in managing high-risk diagnostic findings. Key achievements include dramatic improvement in Delayed Imaging Surveillance (DIS) completion rates[2], with annual successful interventions increasing from 290 cases (2018) to 827 (2022). The team now completes 64-91% of outstanding DIS findings, up from a 2018 baseline where 17% of cases were overdue with no follow-up. Analysis of outcomes revealed critical impact: 4.3% of completed cases resulted in cancer diagnoses, and 3.1% required surgical intervention – potentially life-saving findings that might have been missed[3,4]. Abnormal mammogram follow-up completion increased from 83% to 87%6, while abnormal tumor marker follow-up gaps decreased from 15% to 11%7.

The program's effectiveness stems from addressing social determinants of health and language barriers, with 44.8% Spanish-speaking patients served through bilingual staff5. Integration of the population health component in the EHR has streamlined workflows, enabling proactive patient management and improved outcomes tracking.

Describe how the project/initiative represents an innovation or novel approach.

Parkland's Safety Net Surveillance program transforms traditional fragmented diagnostic surveillance into a comprehensive, digitally-enabled system. The innovation lies in centralizing high-risk surveillance under a single virtual team, evolving from paper lists and disconnected solutions to a fully integrated EHR-based system. This 'digital-first' strategy enables real-time identification of at-risk patients across multiple diagnostic scenarios. The program pioneered a data-driven methodology that began with delayed imaging surveillance and expanded to six distinct diagnostic pathways. Each pathway follows standardized protocols while maintaining flexibility for patient specific needs.

Further advancing this innovation, we've developed an AI language model[15] achieving 97.2% accuracy in identifying delayed imaging findings, with 99.3% sensitivity and 96.7% specificity. This automation enhances the team's ability to capture at-risk patients while creating a framework for developing additional AI-assisted surveillance tools.

The program's innovative approach to health equity sets it apart. By integrating bilingual staff trained in cultural competencies and embedding social drivers screening into workflows, the team effectively addresses diagnostic disparities affecting vulnerable populations. Virtual care options remove traditional access barriers, while targeted support for patients without PCPs ensures comprehensive care coordination. Moving beyond traditional navigation, the program provides holistic support through social needs assessment, health literacy guidance, and practical assistance with transportation and financial barriers. This approach acknowledges that successful diagnostic follow-up requires addressing broader social challenges. Technology integration through the population health component in the EHR[9] supports agile processes for patient tracking and risk identification. The system's digital communication tools allow for efficient scaling while maintaining personalized engagement.
The program's scalable framework enables easy addition of new risk categories and adaptation to different healthcare settings. This systematic approach transforms reactive safety event management into proactive risk mitigation, demonstrating how healthcare systems can improve patient safety

through centralized digital solutions while promoting health equity--offering a blueprint for addressing diagnostic errors in vulnerable populations.

How do you monitor that the improvement is sustained?

Parkland maintains sustained improvement through robust EHR integration and systematic monitoring. Using the population health component in the EHR module, we track real-time metrics and outcomes across all surveillance programs. Key performance indicators demonstrate consistent improvement:

DIS Program:
• Annual intervention volumes increased from 290 (2018) to 827 (2022)[1]
• Completion rates improved from initial baseline of 42% to 64-91%[2]
• Analysis of 256 completed cases (Sept 2023-2024) showed critical outcomes[3,4]:
    o 4.3% cancer diagnoses
    o 3.1% requiring surgical intervention
    o 67% stable lesions
    o 13% ongoing surveillance

Additional Programs:
• Abnormal mammogram completion rates improved from 83% to 87%[6]
• Abnormal tumor marker follow-up gaps reduced from 15% to 11%[7]

The team monitors:
• Patient engagement metrics
• Social determinants of health assessments
• Language support needs (44.8% Spanish-speaking)5
• Demographic data to ensure equity
• Reasons for non-completion
• Clinical outcomes by category

Monthly dashboard reviews enable rapid process adjustments and resource allocation, ensuring sustained performance improvement across all six surveillance programs.

Describe how the project/initiative has been or could be replicated across departments or organizations. Share experiences or suggestions on how others could implement.

This initiative provides a framework for healthcare organizations to address diagnostic safety risks. Organizations can leverage EHR capabilities to identify high-risk scenarios where patients might fall through the cracks. Starting with common risks like delayed imaging findings or abnormal labs, teams create standardized criteria for patient identification using existing safety reporting systems.

The model offers flexibility. Organizations can start with a single risk area and expand as resources allow. While Parkland chose a centralized approach, our medical district collaborative partner, UT Southwestern, adapted the program using a department-based model, demonstrating versatility across different settings. The program's strength lies in standardized yet flexible processes for patient outreach and care coordination. These integrate into any EHR using existing tools. The modular design allows adding new risk categories while maintaining consistent surveillance protocols, as shown by our successful addition of five programs since 2022.

This approach has proven successful across healthcare environments, from safety-net to academic centers, making it valuable for any organization committed to reducing diagnostic errors.

Supplemental Document

Figure 1: Total Delayed Imaging Surveillance (DIS) Findings Reviewed Annually (July 2018-September 2024)

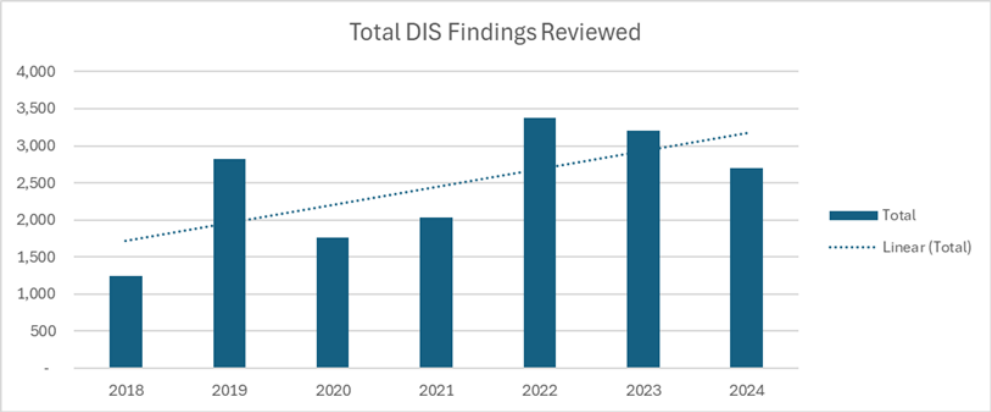

Figure 2: Total DIS findings closed after intervention (*N.B. methodology changed in mid-2023)

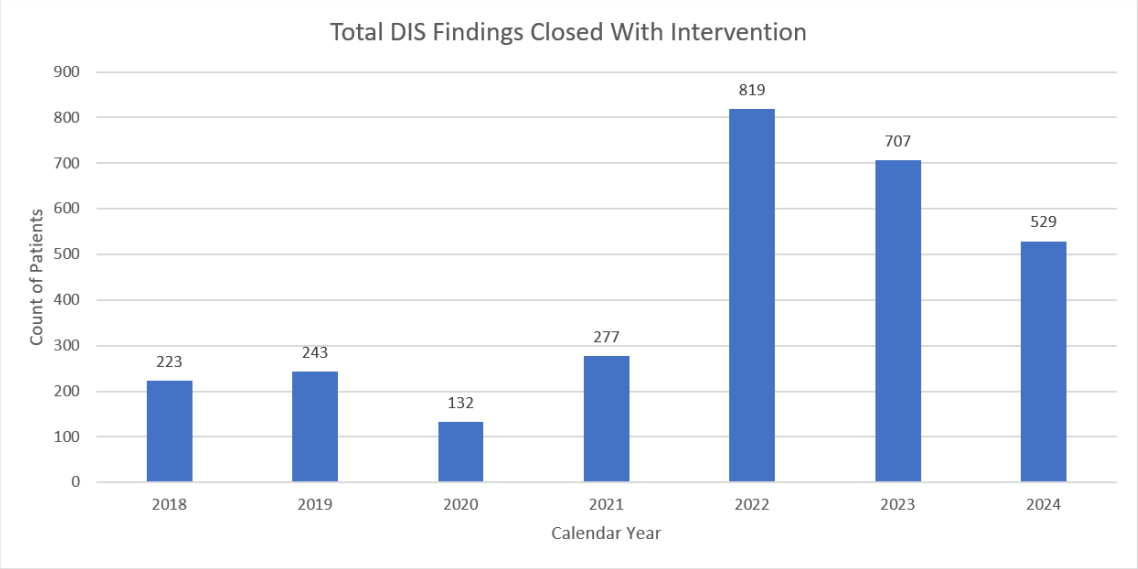

Figure 3: Subsequent interventions in DIS findings (early data sampling, circa 2022)

Subsequent Outcomes: What Happened?

- 58% of cases required some intervention
- 28 (6.6%) required biopsy to further assess
- 24 (6%) required direct treatment, without which, resolution would not occur
  - Surgery
  - Drainage
  - Procedure/ERCP
  - Chemotherapy
  - Radiation therapy

Final Outcome	Count	% of Grand Total
(blank)	179	42.12%
Monitor w/ Cadenced Screenings	94	22.12%
Referral	63	14.82%
Social Work	31	7.29%
Biopsy	28	6.59%
Surgical Removal	12	2.82%
Outside PCP	4	0.94%
Chemotherapy	4	0.94%
Procedure	3	0.71%
IR Drainage	2	0.47%
Medication	1	0.24%
Deceased	1	0.24%
Radiation	1	0.24%
ERCP	1	0.24%
No follow up CT is required per PCP	1	0.24%
Grand Total	425	100.00%

Figure 4: Recent DIS data using Compass Rose tracking final outcomes (September 2024)

Final Outcome (July 2024-Sept 2024)	Count	% of Total
Stable	172	67.2%
Diagnosis inconclusive, further monitoring required	33	12.9%
Benign	24	9.4%
Cancer	11	4.3%
Surgery	8	3.1%
Patient is out of county/not in network	4	1.6%
Patient declined imaging	3	1.2%
Patient is expired	1	0.4%
Grand Total	256	100%

Figure 5: Socio-demographic breakdown of Safety Net Surveillance patient population

Table 1. Patient Demographics (Compass Rose Patients)

	Total (N=5,104)	DIS (N=3,324)	Abnormal Mammogram (N=1,169)	Tumor Marker (N=462)	New Cancer (N=80)
Female, n (%)	3,366 (66)	1,846 (56)	1,169 (100)	278 (60)	54 (68)
Race/Ethnicity, n (%)					
White NH	872 (17)	604 (18)	166 (14)	75 (16)	13 (16)
Black NH	1,175 (23)	797 (24)	206 (18)	123 (27)	23 (29)
Hispanic	2,880 (56)	1,792 (54)	772 (66)	244 (53)	44 (55)
Asian/Pacific Islander NH	109 (2)	86 (3)	8 (1)	14 (3)	0
American Indian/Alaska Native	11 (0.2)	6 (0.2)	3 (0.3)	2 (0.4)	0
Other/Unknown	57 (1)	39 (1)	14 (1)	4 (1)	0
Age, mean ± standard deviation	54 ± 13	55 ± 14	49 ± 8	56 ± 14	57 ± 14
Preferred Language, n (%)					
English	2,421 (47)	1,692 (51)	398 (34)	242 (52)	42 (53)
Spanish	2,538 (50)	1,530 (46)	748 (64)	201 (44)	37 (46)
Other	145 (3)	102 (3)	23 (2)	19 (4)	1 (1)

	Count	% of Total
ADI 1-3	385	14.95%
ADI 4-6	1107	42.99%
ADI 7-10	1083	42.06%
Grand Total	2575	100.00%

**ADI Data only available on 2,575 patients*

Figure 6: Data of Abnormal Mammogram completion rates over the last 3 fiscal years (N.B. Even in the baseline, there were nurse navigators managing patients, during implementation, this moved to the Digital Health Center. Success rates improved slightly.)

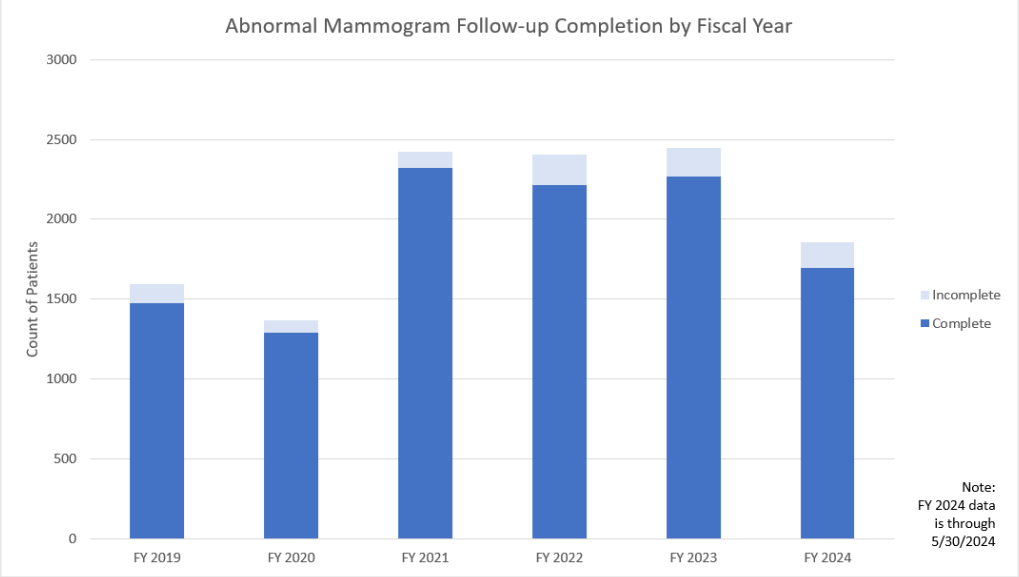

Figure 7: Abnormal tumor marker pre and post data—showing baseline and implementation comparisons of "completion" of ensuring these high-risk patients are connected with either oncology or palliative care.

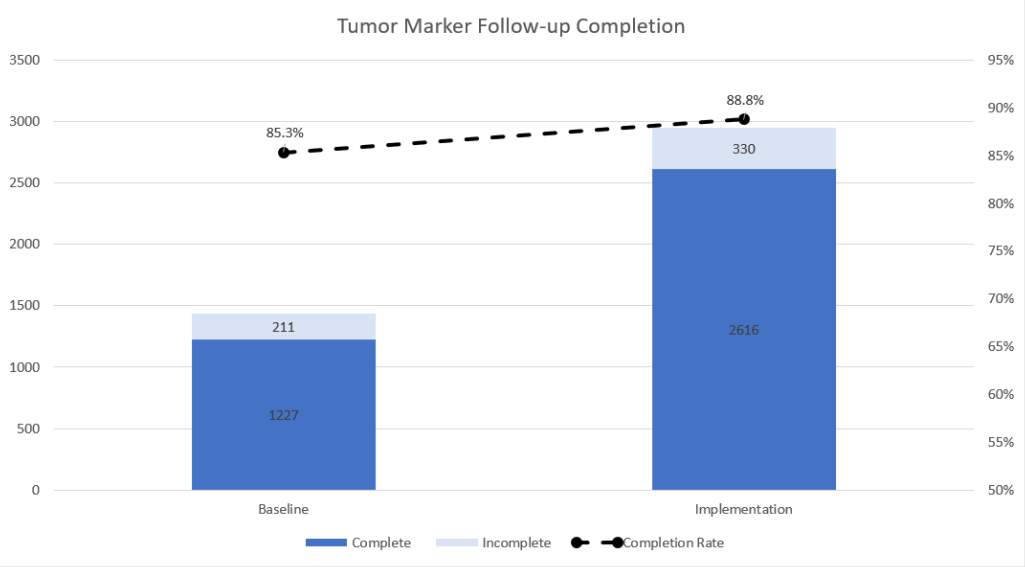

Figure 8: New Cancer Diagnosis: Pre and Post implementation results, showing completion of patients getting connected with either oncology or palliative care

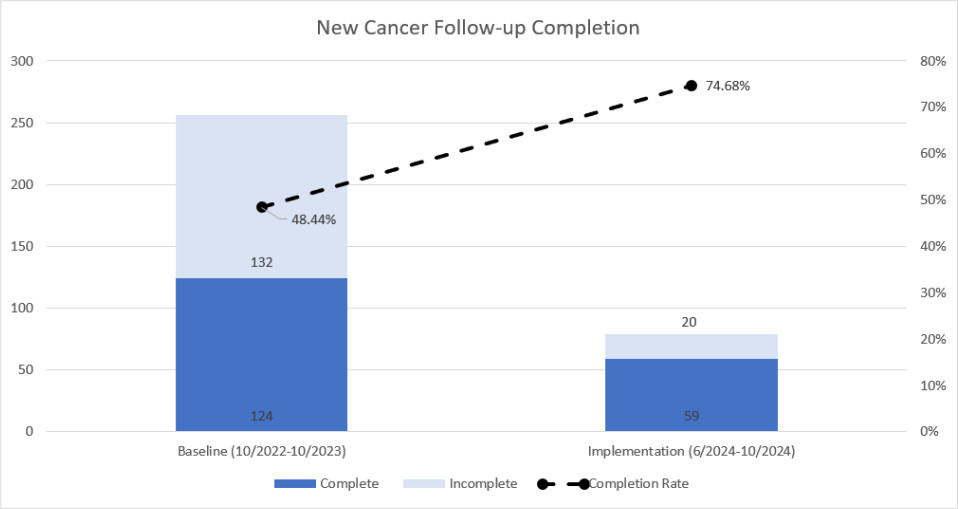

Figure 9: Current Digital Health Center Safety Net Surveillance Team working dashboard integrated into the EHR

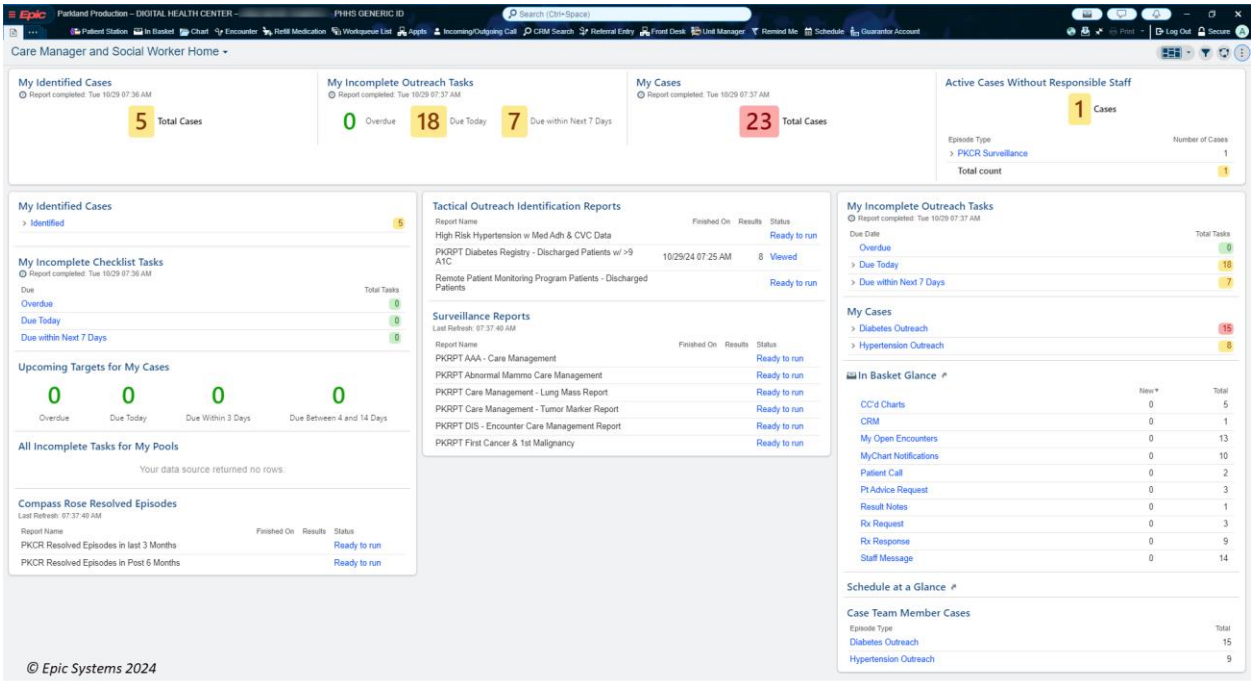

Figure 10: The sentinel event that triggered the beginning of the journey

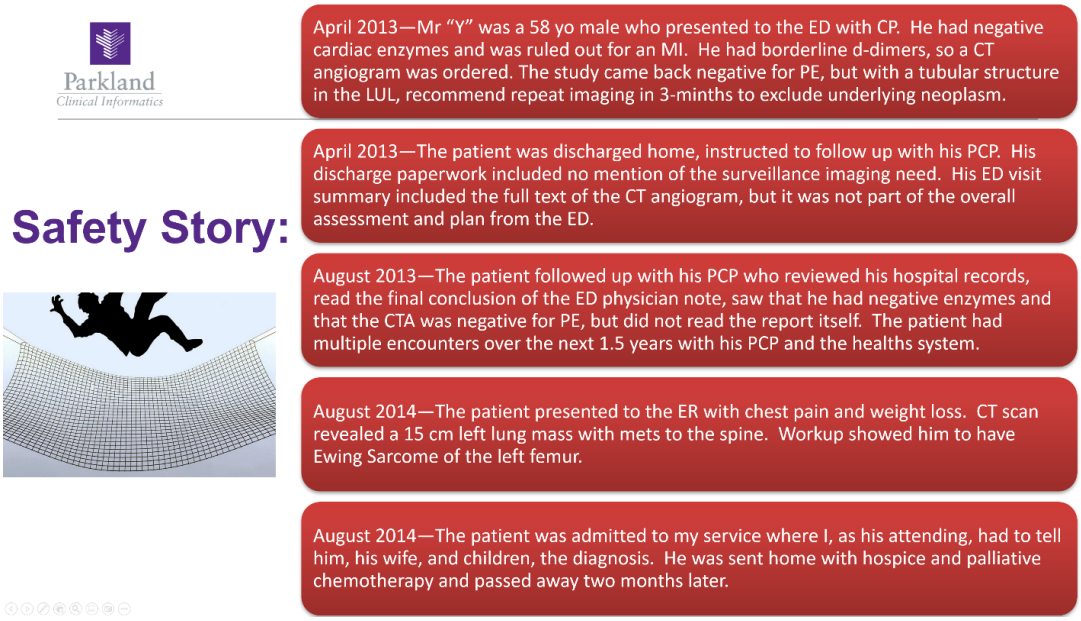

Figure 11: The Digital Health Center grid of varied scope of responsibilities of the team

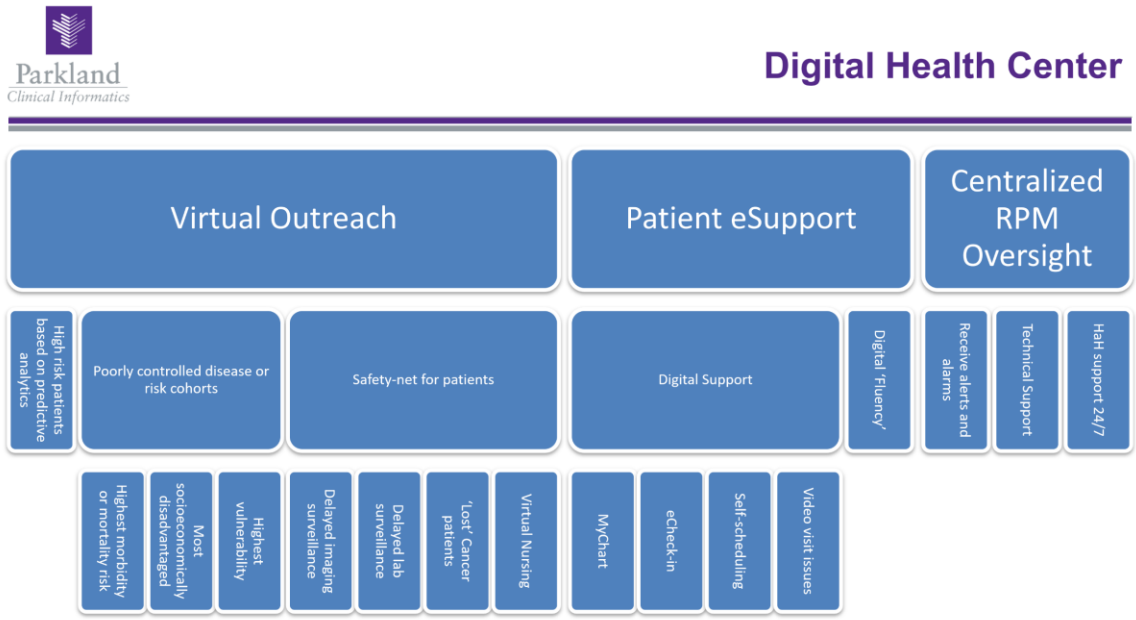

Figure 12: The Safety Net Surveillance Team current initiatives

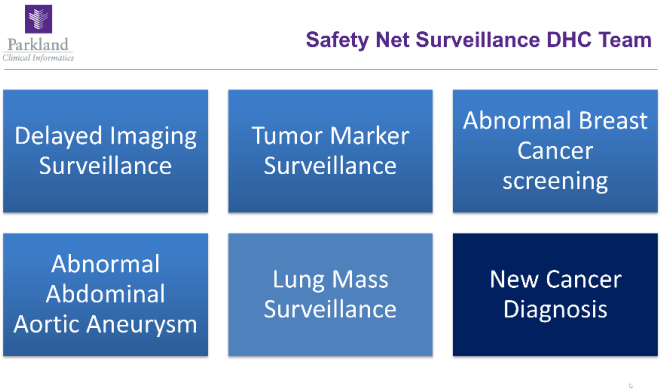

Figure 13: Digital Health Center volume for the last fiscal year

FY24 Safety Net Surveillance Team Activity

Between 10/1/2023 and 9/30/2024 by month

	2023			2024								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Support Type												
DIS Encounter	971	374	149	219	222	249	220	197	177	149	166	105
Abnormal Mammogram	101	82	51	59	90	96	92	137	120	111	74	81
Tumor Marker	38	18	58	41	54	19	26	39	22	26	43	30
New Cancer Diagnosis	0	0	0	0	0	0	0	0	19	41	9	3
AAA-Care Management	2	3	2	0	9	7	6	4	3	2	5	2
Lung Mass	6	1	1	0	0	0	1	0	1	1	0	1
Total*	**3,143**	**672**	**465**	**490**	**1,065**	**454**	**460**	**865**	**655**	**938**	**875**	**642**

Figure 14: A final safety story showing real-world value of the Safety Net Surveillance team that we see several times every month

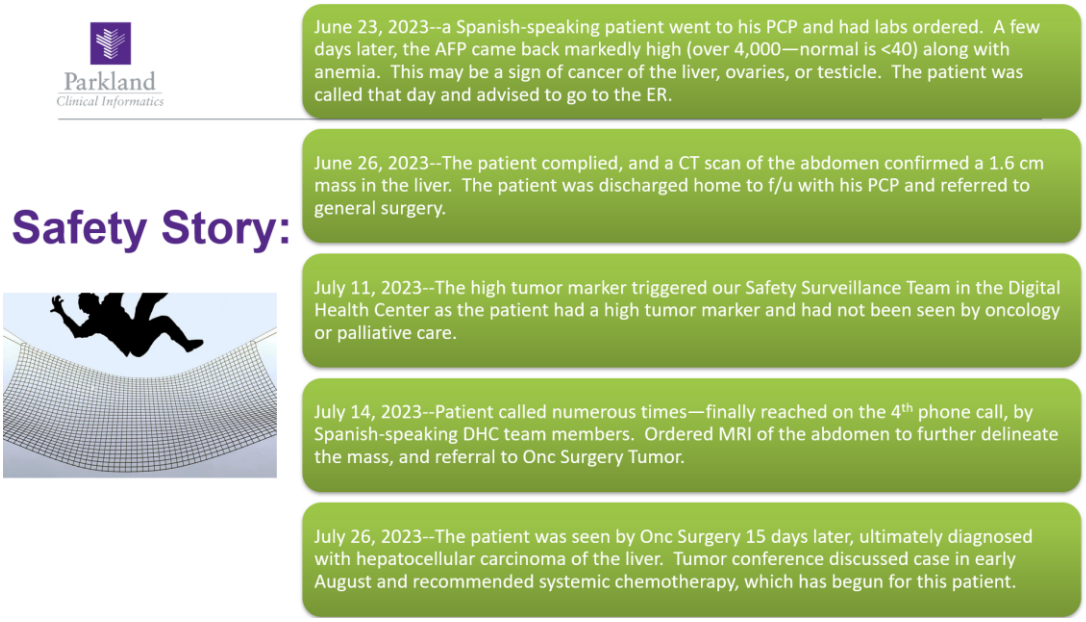

Figure 15: Details about the AI LLM solution for detecting DIS—validated on 1,000 imaging studies, 100 with a DIS finding. You can see that the model outperforms even the manual flagging by the radiologists, having fewer false negatives.