Deploying and Evaluating AI in the NHS: Prostate & Lung Lesion Detection

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Problem:

- **Prostate cancer incidence rising (↑15% by 2040)**
- **Increasing demand for prostate MRI scans**
- **High cost of out-of-hours MRI reporting**
- **Unequal MRI workload across hospital sites**

Solution:

- **Integrate AI-based prostate MRI analysis tool (PI)**
- **Automated risk scores aid biopsy prioritisation**
- **Enhanced lesion identification and targeting**
- **Seamless integration into existing OUH workflow**

Deployment – Best Practice:
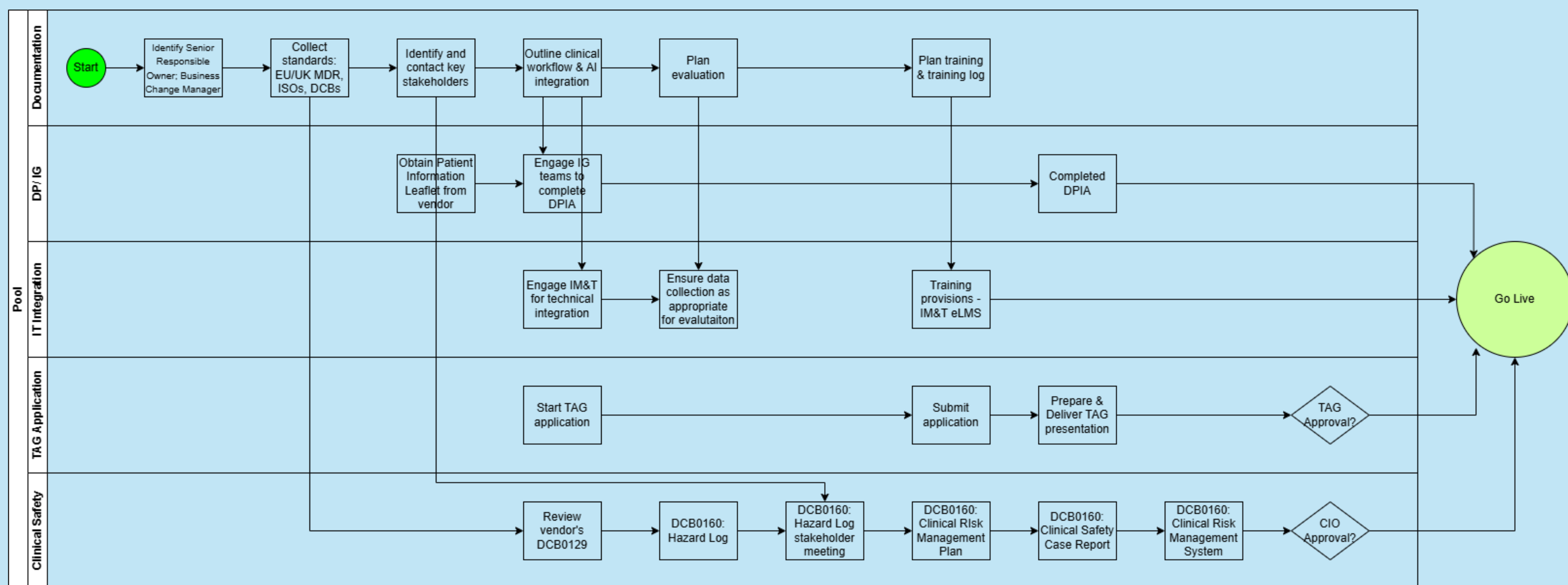
Evaluating AI Technology

- **Software update caused unexpected algorithm changes:** altering lesion measurements and outputs without clear explanation from the manufacturer.
- **No formal verification testing before clinical use:** raising concerns about unvalidated outputs influencing patient care.
- **Potential patient harm:** including risk of misdiagnosis and unnecessary radiation exposure.

Methodology

Patients with a baseline CT before and after the algorithm update were assessed.

Nodule size and volume were compared between old and new software outputs.

Discrepancies in segmentation or scan comparison were flagged for manual review.
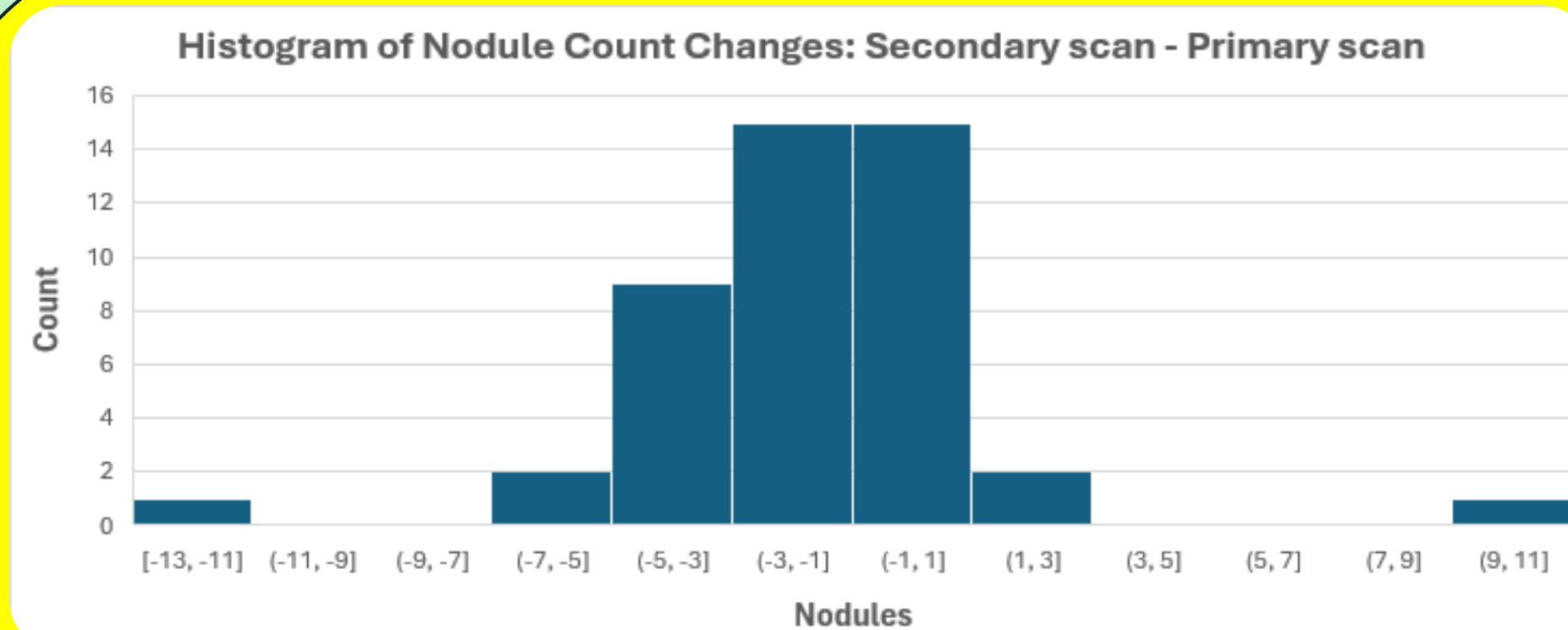
Conclusion

Updated algorithm missed nodules seen previously, limiting comparison.

Fewer nodules detected & smaller volumes reported.

Some patients may have had unnecessary scans, raising safety & efficiency concerns.

Highlights need for rigorous validation before software updates are deployed.

Results

Histogram of Nodule Count Changes: Secondary scan - Primary scan

	Unknown	No priors found
Scan 1	23	0
Scan 2	3	39

Histogram of Nodule Volume Changes

References:
Cancer Research UK. [no date]. Prostate cancer statistics. [Online]. [Accessed 29 August 2024]. Available from: https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/prostate-cancer
NHS. 2022. Faster diagnostic pathways: Implementing a timed prostate cancer diagnostic pathway. Guidance for local health and care systems. [Online]. [Accessed 02 September 2024]. Available from: https://www.england.nhs.uk/wp-content/uploads/2018/04/B1348_Prostate-cancer-timed-diagnostic-pathway.pdf
Lucida Medical. [no date]. Pi™ – Applied Artificial Intelligence for diagnosing prostate cancer from MRI. [Online]. [Accessed 29 August 2024]. Available from: https://lucidamedical.com/pi/
Lucida Medical. [no date]. Clinical needs to address in diagnosing prostate cancer. [Online]. [Accessed 9 September 2024]. Available from: https://lucidamedical.com/clinical-needs/