

Domain 5: Summary of different approaches to the evaluation of lung nodules



Selecting which protocol to adopt for a lung cancer screening programme requires careful consideration. Pulmonary nodules are a small area of opacity on a thoracic scan. Several different types of nodules may be detected during LDCT screening, including benign masses of cells.¹

Examples of characteristics of nodules that may be evaluated during screening include:

- morphology (shape)
- location within the chest
- size (i.e. diameter, volume)
- growth rate (e.g. change in diameter, volume doubling time)
- information based on data extracted from emerging technologies that use quantitative analysis (e.g. computer-aided detection).

A protocol is essential to standardise how different characteristics of nodules are assessed for the likelihood that lung cancer is present.

Below are examples of protocols for the evaluation of results from LDCT screening and how they approach nodule management.

Example protocol*	I-ELCAP ²	EU-NELSON ^{3 4}	Lung-RADS ⁵
Evaluates lung nodules based on	Diameter	Volumetric analysis	Both
Measurement	% change in diameter (mm)	Volume doubling time (e.g. 400 days) ^{a 6}	Both

* Table simplified from Lam *et al.* (2020).⁷ Updates to protocols have since occurred, and this resource is undergoing revision.

^a A measure of the number of days in which a nodule that is visible on a scan is calculated to double in size (volume). In lung cancer screening, VDT may be used to understand how fast a nodule, whether a benign or suspected lung cancer tumour, may be growing between scans.

I-ELCAP: International Early Lung Cancer Action Program; EU-NELSON: Dutch-Belgian Randomized Lung Cancer Screening Trial (Dutch acronym); Lung-RADS: Lung CT Screening Reporting & Data System.

Risk prediction models can also be used to estimate the risk of a lung nodule being lung cancer. These differ from models used to estimate an individual's risk of lung cancer for recruitment purposes (see **toolkit resources for Domain 4**) and instead focus on the specific features of nodules detected during screening. One well-known example is the Brock model (formerly known as the PanCan model).⁸

Regardless of how nodule management is approached, the protocol selected should be centred around consensus-based recommendations to ensure that the appropriate care is offered to the target population.

REFERENCES

1. McNulty W, Baldwin D. 2019. *BJR Open* 1(1): 20180051
2. International Early Lung Cancer Action Program. <http://www.ielcap.org/protocols>
3. Xu DM, Gietema H, de Koning H, *et al.* 2006. *Lung Cancer* 54(2): 177-84
4. van Klaveren RJ, Oudkerk M, Prokop M, *et al.* 2009. *N Engl J Med* 361(23): 2221-29
5. American College of Radiology. 2022. <https://www.acr.org/-/media/ACR/Files/RADS/Lung-RADS/Lung-RADS-2022.pdf>
6. Kanashiki M, Tomizawa T, Yamaguchi I, *et al.* 2012. *Oncol Lett* 4(3): 513-16
7. Lam S, Bryant H, Donahoe L, *et al.* 2020. *Canadian Journal of Respiratory, Critical Care, and Sleep Medicine* 4(4): 236-65
8. Radiopaedia. <https://radiopaedia.org/articles/brock-model-for-pulmonary-nodules?lang=gb>