Supplementary

Appendix 1 Interview discussion guide

1. Patient pathway

1.1. *Questions targeted to radiologists*

1) When it comes to IPN identification and management, is this a common finding? What is your responsibility, and which tasks are handed off to a different physician? Please outline which activities fall within your remit and those that are managed by other members of the team.
2) In your practice do you pro-actively examine scans for IPN? Please explain.
3) When interpreting imaging, what factors, if any, would increase the likelihood of you specifically/pro-actively examining the image for pulmonary nodules? Why (i.e., when would you actually look for it)?
4) When an IPN is detected, do you always mention it in your report? Why or why not?
    a. When reporting an IPN, do you mention it in the body or the summary/key impressions of the report? Why?
5) When an IPN is detected do you utilize a standardized reporting form/macro to facilitate reporting? Why or why not? Can you choose to utilize it?
    a. Is this standardized reporting form/macro designed by you or your institution?
6) Do you always provide explicit recommendations for patient management/follow-up for IPN to the patient's management team? Why or why not?

If recommendations are provided, ask questions 6a) to 6c), as well as questions #7 to #10, and #13.

    a. When providing recommendations, do you specifically provide a rationale for the follow-up plan?
    b. When providing recommendations, do you specifically reference any guideline(s) in your report?
    c. Were you ever unable to provide recommendations for patient follow-up/management for IPN in the past? Why? What key information was missing?
7) When detecting IPN, on which of the following do you base your recommendations?
    a. Published clinical guideline(s) (please specify)
    b. Local/hospital-based protocol(s)
        i. If yes, how do these protocols vary from published guideline(s)?
8) Please indicate your level of agreement with the following statements:
    a. In my practice, I provide recommendations directly aligned with IPN management guideline(s).

Level of agreement				
1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

    b. In my practice, when I choose not to follow guidelines, it is usually because I believe that more intensive management is needed.

Level of agreement				
1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

    c. In my practice, when I choose not to follow guidelines, it is usually because I believe that less intensive management is needed.

Level of agreement				
1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

9) Which of the following factors, if any, increase the likelihood of you deviating from guideline(s)/protocols when providing recommendations?
    a. Level of patient risk/risk factors
    b. Lack of agreement with guidelines
    c. Insufficient detail in guidelines
    d. Time constraints
    e. Lack of priority

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f. Other (please specify)

10) Do you provide the following details in your recommendations (yes/no):

☐Patient risk stratification?

☐Type of follow-up scans?

☐Type of follow-up interventions?

☐Number of follow-up scans?

☐Number of follow-up interventions?

☐Frequency/timing of follow-up scans?

☐Frequency/timing of follow-up interventions?

☐Next steps based on findings in the follow-up?

☐Other (please specify)

11) What is the most common referral pathway for patients with IPN that you see? Is a unique pathway triggered when patients have IPN? How does it work?

    a. In your organization, have you noticed any communication breakdowns when dealing with IPN management/follow up?

        i. If so, when and where is it most noticeable?

12) Has the physician ordering the index scan or the physician downstream in the referral pathway ever asked you for clarification of the management plan?

    a. If yes, is this communication challenging to set up?

    b. If yes, how often have they asked for clarification?

13) Do you receive feedback or monitor whether your recommendations have been followed?

14) In your opinion, is the management plan/risk stratification for IPN easy to follow and execute for non-specialists (i.e., people who are not familiar with guidelines, PCPs, or any generalist)?

    a. What, if anything, do you do in your report in order to ensure that the plan is easy to follow (e.g., specifically refer to guidelines, provide specific recommendation on timing of follow-up imaging, etc.)?

1.2. ***Questions targeted to managing physicians (respirologists, thoracic surgeons, and primary care physicians)***

1) When it comes to IPN management, what is your responsibility, and which tasks fall outside of your purview/are handed off to a different physician?

2) At what stage of their journey do patients with IPN enter your practice? In your practice, how/when are IPN patients most commonly identified?

    a. In your opinion, is the referral pathway of a patient with incidentally detected pulmonary nodules clear/easy to follow within your organization?

    b. Do you always receive notification of radiology report? How is it shared with you? What are your next steps when you receive the report?

    c. Which physician most commonly orders the index scan and why/where? How many come from each referring physician?

    d. If applicable, how often are patients with IPN referred to your practice for management? Who is the primary referrer?

3) Can you describe a situation in your practice where a patient was identified via incidental nodule and how they were managed? In your opinion, did this patient fall through the cracks leading to suboptimal outcomes?

4) What challenges do you experience when managing patients with IPN?

    a. Delays in patients being referred to you

    b. Lack of clear risk stratification

    c. Lack of clarity on type of follow-up/interventions

    d. Lack of clarity on appropriate length of follow-up

    e. Delays in follow-up imaging/investigations

    f. Lack of clear communication/referral pathways for follow-up

    g. Lack of priority from patient side

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5) What is your approach to determining the management plan for patients with IPN? When setting a plan for managing patients, do you primarily use guidelines or radiologist recommendation, or both? Why?
    a. What other sources of information do you base your management plan on?
6) When setting a plan for managing patients, do you feel that recommendations provided by guidelines/the radiologist are sufficient? What other information would be critical?
    a. What actions do you take, if any, to validate your management plan when you feel like the guideline/radiologist recommendations are insufficient?
7) How often do you deviate from:
    a. Radiologist recommendation
    b. Guideline(s) recommendation
8) What factors increase likelihood of deviating from the guideline(s) and providing:
    a. More intensive management
    b. Less intensive management
9) What factors increase likelihood of deviating from the radiologist recommendation and providing:
    a. More intensive management
    b. Less intensive management
10) Do you consult other physicians when determining the management plan/determining whether to deviate from guideline(s)/radiologist recommendations?
    a. If yes, do you engage in formal multi-disciplinary collaboration?
11) When patients arrive at your practice or are referred to your practice, have they already been notified that they have an IPN?
    a. If they are not aware, do you always inform patients of a presence of IPN? Why or why not?
    b. What factors increase the likelihood that you will report and explain an IPN to the patient?
12) Do you find that patients are frequently concerned when you notify them of the presence of IPN? What factors, if any, affect the likelihood of patients being concerned?
13) Do you find that patients frequently ask many questions when you notify them of the presence of IPN?
    a. Do you feel well equipped to answer their questions on:
        i. Management plans/follow-up
        ii. Risk/clinical outcomes
14) Does nursing staff support your practice in explaining IPN to patients?
15) Do you feel patients are motivated to follow the recommendations? What factors are associated with greater patient motivation?
16) When, if at all, do you consider referring patients out for IPN management?
    a. Where/to whom do you refer patients?
    b. What factors increase the likelihood that you will out-refer patients?

1.3. *Questions targeted to medical oncologists*

1) Firstly, we'd like to know more about the patients that you manage, and specifically how many of those are patients who were originally identified incidentally. Thus, when patients come to your clinic/practice, are you aware of whether they had a nodule detected incidentally vs other route of diagnosis?
    a. If yes, how many incidental pulmonary nodule patients do you see or are identified incidentally per year in your practice?
    b. If no, what clinical history is shared with you?
        i. Do you get a full history of the monitoring and interventions that were performed for the patient with a pulmonary nodule before they come to your clinic? Why or why not?
        ii. Do you receive the initial scans and associated radiology report?
        iii. Do you see the explicit recommendations for patient management/follow-up for IPN that were received prior to the patient being referred to your clinic? How, if at all, would this impact your management of the patient?

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2) At what point, in their monitoring and/or treatment journey, does a patient with a pulmonary nodule get referred to you? Do you know how long a patient with an incidental lung finding may be managed/triaged prior to being referred to your clinic?
3) Is the prognosis or patient profile different for patients detected incidentally compared to other patients? In particular, would you say patients with incidentally detected pulmonary nodules referred to you are more often at a late stage (progressed or metastatic)?
    a. What are the differences? Which are easier to manage?
    b. What factors are associated with a patient having late stage/stage IV lung cancer at diagnosis?
    c. Does this differ between patients with incidentally detected versus screen detected nodules/other patients? Is one more efficient than the other?
4) Can you describe a situation in your practice where a patient was identified via incidental nodule and how they were managed? In your opinion, did this patient fall through the cracks leading to suboptimal outcomes?
5) Do you ever manage patients who do not have confirmed cancer (pulmonary nodule under investigation)?
6) Are you ever involved in multidisciplinary discussions around risk-stratifying or managing patients with pulmonary nodules who do not (yet) have confirmed cancer? How different would this be for IPN patients?
7) In your practice, who are the most common physicians referring patients to you with incidentally detected pulmonary nodules/incidentally detected cancer?
    a. Are the referring physicians different when patients are coming from a screening program? When cancer is detected due to symptoms/at a late stage? How?
8) In your opinion, is the referral pathway of a patient with incidentally detected pulmonary nodules clear/easy to follow within your organization?
    a. How about if the patient is coming from outside your organization?
    b. How does this compare to patients coming from a screening program or who are symptomatic/have late-stage lung cancer?
9) What investigations have IPN patients undergone before being referred to your clinic (imaging, biopsy, other)?
    a. Are the past investigations/monitoring different when patients are coming from a screening program?
    b. When the patient is symptomatic/identified at late stage?
    c. How does this inform the management plan?
10) Does the quality/breadth of the patient's clinical history vary whether they are a patient with an incidental nodule versus a nodule detected in a screening program versus any other route of diagnosis?
    a. What history is key to your management of the patient?
11) Which guidelines on the management of IPN are you familiar with?
12) How appropriate/useful are IPN guidelines? Under what situation do you think guideline recommendations may not be applicable or it is appropriate to deviate from IPN guidelines?
    a. Level of patient risk/risk factors
    b. Lack of agreement with guidelines
    c. Insufficient detail in guidelines
    d. Time constraints
    e. Lack of priority
    f. Other (please specify)
13) Could better IPN guideline adherence help patient care in oncology?

2. Healthcare infrastructure and communication

2.1. *General questions targeted to all KOLs*

1) In your current organization, overall, how would you rate the unmet need associated with the management and follow-up of IPN on a scale of 1 (low) to 5 (high) and why?

Unmet need associated with the management of IPN				
1	2	3	4	5
Low	Low Medium	Medium	Medium high	High

2) What are the main challenges/obstacle you face with IPN management?

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a. Communication breakdowns, lack of follow-up

b. Complex clinical guidelines

3) In your opinion, do the following challenges/obstacles occur today when managing patients with IPN? Would you be able to rank them by level of importance (most important/highest priority to least important/lowest priority.

Challenges/obstacle	Yes/No?	Priority
Lack of awareness/ adherence to clinical guidelines (e.g., inappropriately applied during identification or IPN management pathway)		
Lack of staffing, time etc.		
Lack of appropriate systems that would facilitate IPN follow up and/or monitoring		
Lack IPN education materials that would help guide discussion with patients		
Lack of standardized radiology report (i.e., methods of reporting) that would inform IPN management strategy/pathway and improve uniformity/completeness of IPN reports		
Lack of patient awareness which may lead to delay or lack of compliance to follow up recommendations		
Overshadowing IPN management by both clinicians and patients		
Suboptimal IPN management guidelines		
Other (Note to moderator, please allow the KOL to add additional points, if applicable)		

4) What 2-3 key changes could significantly improve IPN follow up/management?

5) In your opinion, what would be the ideal system to ensure appropriate IPN follow up/management? Where is this implemented?

2.2. ***Communication questions targeted to all KOLs***

1) In your organization, have you noticed any communication breakdowns when dealing with IPN management/follow up?
    a. If so, when and where is it most noticeable?
    b. At what point in the pathway does this most commonly happen and why?
        i. Are the communication breakdowns noticeable or within the organization?
        ii. Are the communication breakdowns noticeable between organization (e.g., from hospital to hospital, from hospital to clinic)
    c. What piece of information gets commonly lost?
2) In your organization, is there a communication pathway/system in place to ensure appropriate IPN follow up? If yes, please describe the system. If not, can you explain why such systems have not been implemented?
3) How appropriate are the communication systems in place to monitor patient follow up within your organization? Please explain
4) How appropriate are the communication systems in place to monitor patient follow up between organizations?
5) What ideal system/tool would be needed in order to avoid communication breakdown in IPN management? Where is this implemented?
6) How familiar are you with multidisciplinary clinics/teams for IPN management?
7) In your opinion, how would the implementation of multidisciplinary clinics/teams improve IPN management?
8) Do you think that implementing a formal multidisciplinary clinics/teams is necessary in IPN management? (Note to moderator, please ask if this question is relevant for all patients or some)

2.3. ***Adherence to guidelines questions targeted to all physicians***

1) In your organization and your practice, would you say that there is enough awareness of IPN guidelines? Question targeted/tailored to medical oncologists
    a. Is awareness of lung cancer screening guidelines sufficient?
2) In your organization and your practice, would you say that there is enough adherence to IPN guidelines? What is the impact on patient outcome when deviating from guideline?
3) Do you think the guideline are detailed enough (i.e., flexible) to support the management of a broad population?
4) In your opinion, what can be done to improve awareness and adherence to guidelines?

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2.4. *Questions targeted to medical oncologists*

1) In your current organization, overall, how would you rate the unmet need associated with the management of patients with IPN on a scale of 1(low) to 5 (high) and why?

Unmet need associated with the management of IPN					
0	1	2	3	4	5
NA	Low	Low Medium	Medium	Medium high	High

2) Do you believe that IPN management requires significant time investment on your part or your colleagues?

Level of agreement					
0	1	2	3	4	5
NA	Never	Rarely	Sometimes	Often	Always

3) Do you believe that insufficient emphasis has been placed on management of IPN when discussing initiatives to improve early lung cancer diagnosis?

Level of agreement					
0	1	2	3	4	5
NA	Never	Rarely	Sometimes	Often	Always

4) Which of the following reasons are associated with insufficient emphasis being placed on improving IPN management as a key initiative:

   a. Lack of awareness of the issue
   b. Lack of priority on the issue
   c. Lack of clear solution
   d. Lack of consensus between stakeholder on solution
   e. Lack of clarity on key stakeholders/who should take leadership
   f. Lack of funding
   g. Other

5) Do you believe that inappropriate management of IPN can lead to delays in lung cancer diagnosis?

Level of agreement				
1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

   a. If so, how often do you see this occur?
   b. Can you describe any example(s) where inappropriate management led to delays?

6) Do you believe that the benefits of appropriate IPN management outweigh the potential risks?

Level of agreement				
1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

7) Do you feel that appropriate IPN management can lead to cost savings by reducing costs related to lung cancer management/treatment?

Level of agreement				
1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

8) Do you think that multidisciplinary communication/collaboration when managing IPN is sufficient? Do you think greater MD collaboration is needed? How can this be implemented?

9) Do you find any differences in patient understanding of risk/understanding of lung cancer if they have IPN or come from screening? Do you feel like patient education is a benefit of screening?

   a. What kind of questions do patients ask?

10) What are the main challenges/obstacles related to management of IPN patients from a healthcare infrastructure/communication perspective? How does this affect your practice?

   a. What 2-3 key changes could significantly improve IPN follow up/management?

11) Can you provide examples of systems that may help improve the referral pathway of IPN patients? Referencing

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systems that have been implemented to optimize lung cancer screening patient referrals is welcome.

12) Have these systems been used/successful in your organization?
    a. If so, please explain
    b. If not, please can you give us the reason for failure
13) In your practice, would you say that IPN management is sufficiently in line with the guidelines that are often followed?
14) In your opinion, is there a need to improve awareness and adherence to guidelines? What can be done?
    a. What, if anything, has been done to increase awareness and adherence to lung cancer screening guidelines?

2.5. *Questions targeted to epidemiologist*

1) Based on your experiences in lung cancer screening and identification of screen-detected pulmonary nodules, what are the key factors that can impact IPN identification in Canada? Who are the key stakeholders?
    a. How important are physician-related factors? (healthcare provider (HCP) education/guideline awareness, HCP motivation, HCP time and resources, etc.)
    b. How important are patient-related factors? (patient education, patient motivation, patient compliance, etc.)
    c. How important are healthcare infrastructure/system-related factors? (medical communication, availability of healthcare and health equity, etc.)
2) Are you familiar with guidelines related to IPN identification/classification/management?
    a. Can you comment on which guidelines are most referenced and used across Canada for IPN identification and management?
    b. If yes, what are the key unmet needs or drawbacks related to the currently available IPN guidelines, in particular from an epidemiological or clinical data perspective?
    c. What can be done to address these unmet needs?
    d. What can be done to improve adoption and adherence to guidelines? Can technology be utilized (e.g., AI) to improve identification?
3) Overall, how would you rate the unmet need associated with the identification of IPN on a scale of 1 (low) to 5 (high) and why?

Unmet need associated with the management of IPN				
1	2	3	4	5
Low	Low Medium	Medium	Medium high	High

4) What are the key factors that can impact IPN management in Canada, once an IPN is identified? Who are the key stakeholders?
    a. How important are physician-related factors? (HCP education/guideline awareness, HCP motivation, HCP time and resources, etc.)
    b. How important are patient-related factors? (patient education, patient motivation, patient compliance, etc.)
    c. How important are healthcare infrastructure/system-related factors? (medical communication, availability of healthcare and health equity, etc.)
5) Overall, how would you rate the unmet need associated with the management of IPN on a scale of 1 (low) to 5 (high) and why?

Unmet need associated with the management of IPN				
1	2	3	4	5
Low	Low Medium	Medium	Medium high	High

3. Initiatives launched

3.1. *General questions targeted to all KOLs*

1) In your organization, in recent years, has your organization implemented initiatives in an attempt to improve IPN?
2) Can you provide examples of systems that have been implemented in your organization OR that you are

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aware of in an attempt to improve IPN management and follow up? (Note to the moderator, a system can be a multidisciplinary clinic, standardized radiology reports etc.)

3) Have these systems been successful in your organization.

    a. If so, please explain what contributed to the success of these initiatives?

    b. If not, please can you give us the reason for failure.

    c. Main obstacle faced? (i.e., funding, physician buy-in, resources)

4) Please rank the following initiatives based on the value they would bring to improve IPN in your organization

Initiatives	Value perceived
Enhanced radiology reports (e.g., a strict template)	1-2-3-4-5
Adoption of a closed loop communication tool	1-2-3-4-5
Additional trainings	1-2-3-4-5
Referring the patient to a multidisciplinary nodule clinic	1-2-3-4-5
Adoption of a tracking system	1-2-3-4-5
Other	1-2-3-4-5

5) What are the processes for implementing a new initiative?

    a. What criteria are followed?

    b. How long does it take?

6) Who are the main stakeholders that need to agree in order to implement a new initiative in your organization (buy-in)?

7) What would be the main hurdles when trying to implement a new initiative in your organization?

8) Please rank the following institutional challenges from 1 (Minor and surmountable challenges) to 5 (major roadblocking) most burdensome

Institutional challenges	Pain points
Financial	1-2-3-4-5
Resources (e.g., lack of staff)	1-2-3-4-5
Physician buy-in (e.g. not critical)	1-2-3-4-5
Complex admin (guidelines at the hospital)	1-2-3-4-5
Heterogeneity of population	1-2-3-4-5

9) Based on your ranking, what would be the solutions for the institutional challenges identified previously? What are your recommendations?

10) Based on your experience, how would you rate your organization's willingness to change/improve IPN practice/systems? And why?

11) Are you aware of any technology/systems used elsewhere that you wish you had access to?

3.2. *Questions targeted to medical oncologists*

1) In your opinion, where do you see medical oncologists falling into place when it comes to implementing initiatives to improve the management of IPN?

2) In recent years, has your organization implemented initiatives in an attempt to improve the management of IPN?

    a. If yes,

        i. Were these initiatives successful? What contributes to the success of these initiatives?

        ii. If unsuccessful, why? What were the main reasons they failed?

    b. If no, why? what were the main obstacle faced? (Probe for funding, physician buy in, resources)

3) What are the processes for implementing a new initiative?

    a. What criteria are followed?

    b. How long does it take?

4) Who are the main stakeholders that need to agree in order to implement a new initiative in your organization

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(buy-in)?

5) What would be the main hurdles when trying to implement a new initiative in your organization?

6) Please rank the following institutional challenges from 1 (Minor and surmountable challenges) to 5 (major roadblocking) most burdensome

Institutional challenges	Pain points
Financial	1-2-3-4-5
Resources (e.g., lack of staff)	1-2-3-4-5
Physician buy in (e.g., not critical	1-2-3-4-5
Complex admin (guidelines at the hospital)	1-2-3-4-5
Heterogeneity of population	1-2-3-4-5

7) Based on your ranking, what would be the solutions for the institutional challenges identified previously? What are your recommendations?

8) Based on your experience, how would you rate your organization's willingness to change/improve practice/systems to better manage IPN referred patients? And why?

9) Are you aware of any technology/systems used elsewhere that you wish you had access to? Note to moderator: initiatives different from the ones mentioned above

4. Clinical and Economic Implications of IPN Identification and Management

Questions targeted to epidemiologist

1) In your opinion, do you think the current evidence on the clinical implications and long-term clinical outcomes of IPN is sufficient? Why?

2) Please provide your level of agreement with the following statements:

    a. Additional evidence on the long-term clinical outcomes of IPN is required

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

    b. Understanding long term clinical outcomes is critical to improve IPN identification/management in Canada

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

3) What is the highest priority additional evidence that should be considered on long term clinical outcomes of IPN?

    a. Patient characteristics and risk factors
    b. Length of follow-up and type of follow-up
    c. Rates of loss to follow-up
    d. Rates of adverse events
    e. Rates of early lung cancer development (and over what timeframe)
    f. Rates of metastatic cancer diagnosis (and over what timeframe)
    g. Rates of death (and over what timeframe)

4) What can be done to fill in this gap?

    a. Are there any specific studies you would like to see? What are the key considerations for study design?

5) Who are the relevant stakeholders that would need to be engaged to fill in this gap? How can we ensure stakeholder buy-in?

    a. How do needs vary across different stakeholder audiences?

6) How can this data be best utilized/disseminated to improve IPN management?

    a. How was similar data utilized/disseminated for lung cancer screening programs? What learnings can be applied to IPN identification/management?

7) Do you think learnings of clinical outcomes from studies examining screen-detected nodules is applicable to IPN?

    a. What are the key differences, from a clinical data/clinical outcomes perspective, when considering IPN vs

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screen detected nodules?

b. What are the key differences, from a clinical study to fill in the relevant gaps perspective, when considering IPN vs screen detected nodules?

8) What learnings can be drawn from studies examining data and outcomes of nodules detected in screening?

9) In your opinion, do you think the current evidence on the economic implications and economic outcomes of IPN management is sufficient? Why?

10) Please provide your level of agreement with the following statements:

a. Additional evidence on the healthcare resource use required for identification of IPN is required.

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

b. Additional evidence on the healthcare resource use required for management of IPN is required.

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

c. Understanding economic outcomes/HCRU is critical to improve IPN identification/management in Canada.

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

d. Understanding cost-effectiveness of IPN management is critical to improve IPN identification/management in Canada.

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

11) What is the highest priority additional evidence that should be considered on economic outcomes of IPN?

a. Healthcare resource use and costs related to identification/management of IPN

b. Physician time related to identification/management of IPN

c. HCRU and physician time related to treatment of downstream lung cancer

d. Cost savings related to reduction in lung cancer diagnosis (any stage)

e. Cost savings related to late-stage lung cancer diagnosis

12) What can be done to fill in this gap?

13) Are there any specific studies you would like to see? What are the key considerations for study design?

14) Who are the relevant stakeholders that would need to be engaged to fill in this gap? How can we ensure stakeholder buy-in?

a. How do needs vary across different stakeholder audiences?

15) How can this data be best utilized/disseminated to improve IPN management?

16) In particular, can risk prediction models optimize patient management and lead to cost savings? Is this a key value message that can improve stakeholder buy-in?

17) Do you think cost-effectiveness data is key for the adoption of new initiatives? What can be done to ensure that the initiatives are cost-effective?

5. Initiatives to Improve IPN Management in Canada

Questions targeted to epidemiologist

1) Planning phase:

a. What key steps were taken to identify the appropriate solutions to the issues surrounding identification and management of pulmonary nodules identified in the context of a screening program?

b. Who were the stakeholders involved in identifying the solution (HCPs, policymakers/government, patients etc.)?

i. What role did they play? How were they engaged/recruited?

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ii. How important was cross-functional/multidisciplinary collaboration?

iii. What steps were taken to ensure stakeholder buy-in/mitigate stakeholder hesitancy?

c. What other resources were utilized when determining the solution (e.g., published research, examining what other countries had done, etc.)

d. What were the key challenges in identifying the appropriate solution? Which of the following challenges were experienced:

i. Lack of data/clear solution

ii. Lack of consensus between stakeholders on what is the appropriate solution

iii. Lack of motivation/interest from HCPs

iv. Lack of motivation/interest from policymakers

v. Lack of funding

vi. Lack of priority

e. What learnings could be applied to IPN-related challenges?

2) Implementation phase:

a. What key steps were taken to implement/launch the solution?

b. Who were the key stakeholders involved, and what were their roles?

i. How important was cross-functional/multidisciplinary collaboration?

ii. Were any additional stakeholders (not part of planning phase) engaged at this point in time?

iii. What steps were taken to ensure stakeholder buy-in/mitigate stakeholder hesitancy?

c. What were the key challenges related to implementation? Which of the following challenges were experienced:

i. Lack of consensus between stakeholders on how to implement the solution

ii. Lack of motivation/interest from HCPs

iii. Lack of motivation/interest from policymakers

iv. Lack of funding

v. Lack of appropriate infrastructure to implement solution

vi. Lack of priority

d. What do you think could have/should have been done differently?

e. What learnings could be applied to implementing solutions related to IPN identification and management?

3) Regarding risk prediction models for risk of malignancy in a lung cancer screened population:

a. What was the impact and the key benefits of this solution?

b. How was this solution proposed?

c. Who were the key stakeholders involved?

d. What were the key challenges involved in implementing this solution?

e. How relevant is this solution to improving management of IPN?

f. How feasible is this solution for improving IPN management?

g. What learnings can be applied to IPN? What key stakeholders should be involved?

4) How can we utilize technology, including natural language processing/artificial intelligence to optimize IPN management?

a. In your opinion, how could this technology impact IPN management?

b. What is necessary in order to get buy-in from key stakeholders?

c. What data is required and what are the key next steps?

6. Wrap up and closing

General questions targeted to all KOLs

1) Do you agree with the following statement: IPN patient identification and follow-up is an issue today (i.e., low rates of patient identification and follow up post imaging).

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Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

2) Do you agree with the following statement: IPN identification relies on guideline awareness and clinical judgement and may not always be reported.

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

3) Do you agree with the following statement: Recommendations show varying degrees of radiologist conformance (34.7%-60.8%) with guidelines, based on literature findings.

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

4) Do you agree that patients and clinicians often do not adhere to recommended follow-up plan due to lack of continuity and coordination in care?

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

5) Do you agree that patients and clinicians often do not adhere to recommended follow-up plan due to information overload?

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

6) Do you agree that patients and clinicians often do not adhere to recommended follow-up plan due to communication breakdowns?

Level of agreement				
1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

7) In your opinion, what is the primary gap across Canada regarding IPN identification and management? Why? Question targeted to medical oncologists and epidemiologist

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Table S1 Search terms for the biomedical electronic literature databases including Embase, MEDLINE, and MEDLINE In-Process

Criteria	No.	Query	Results
Population	#1	(('incidental finding' OR 'incidental findings') NEAR/2 ('lung' OR 'pulmonary')) OR 'incidental lung nodule$':ti,ab OR 'incidental pulmonary nodule$':ti,ab OR 'incidental nodule$':ti,ab OR 'ipn':ti,ab OR 'lung nodule'/exp OR 'lung nodule':ti,ab OR 'lung parenchyma nodule':ti,ab OR 'pulmonary nodule':ti,ab	33,423
	#2	(('multiple' OR 'solitary') NEXT/2 ('lung nodule$' OR 'pulmonary nodule$')) OR (('pulmonary nodule' OR 'pulmonary nodules' OR 'lung nodule' OR 'lung nodules') NEAR/2 ('ct' OR 'computed tomography' OR 'computer assisted tomography' OR 'scan' OR 'ct scan'))	7,484
	#3	#1 OR #2	35,729
Outcomes	#4	'clinical pathway'/exp OR 'clinical pathway':ti,ab OR 'clinical protocol'/exp OR 'clinical protocol':ti,ab OR 'consensus'/exp OR 'consensus':ti,ab OR 'consensus development'/exp OR 'consensus development':ti,ab OR 'consensus workshop':ti,ab OR 'clinical practice':ti,ab	804,867
	#5	(practice OR treatment OR management OR clinical OR 'current practice') NEXT/2 (guideline$ OR reccomendation$ OR standard$ OR algorithm$)	652,502
	#6	(patient OR care OR current) NEXT/2 (pathway OR journey OR algorithm OR management OR practice)	217,515
	#7	('standard' OR 'integrated' OR 'multidisciplinary' OR 'streamlined') NEAR/2 (care OR 'patient care' OR pathway OR journey OR algorithm OR treatment OR management)	279,295
	#8	((process OR method OR quality OR 'patient outcome$') NEXT/2 (optimization OR improvement OR management OR control)) OR 'healthcare quality':ti,ab	529,918
	#9	#4 OR #5 OR #6 OR #7 OR #8	2,217,880
	#10	'animal'/exp NOT 'human'/exp	6,045,411
	#11	#3 AND #9	3,243
	#12	#11 NOT #10	3,217
Full-text publications only	#13	#12 AND ([article]/lim OR [article in press]/lim) AND [2010-2023]/py	1,299

Table S2 Key conference proceedings and registries

Provincial Cancer and Health Ministry Websites	National Health Technology Assessment Bodies	National and Provincial Cancer/ Professional Societies
• British Columbia (BC) Cancer Agency • HealthLink BC • Alberta Health Services • Cancer Care Manitoba • Cancer Care Ontario • New Brunswick Cancer Network • Nova Scotia Health Authority Cancer Care Program • Prince Edward Island (PEI) Health • Atlantic Cancer Research Institute • Windsor Regional Hospital Cancer Program	• Canadian Agency for Drugs and Technologies in Health (CADTH) • Institut national d'excellence en santé et en services sociaux (INESSS) • INESSS Algorithms in Cancerology	• Canadian Cancer Society • Canadian Association of Radiologists • Lung Cancer Canada • Canadian Thoracic Society (CTS) • BC Cancer Foundation • Alberta Cancer Foundation • Cancer Foundation of Saskatchewan • Fondation québécoise du cancer

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Table S3 Inclusion and exclusion criteria

Category	Inclusion criteria	Exclusion criteria
Population	IPN identified patients in Canada. Only those detected incidentally will be of interest.	Lung nodules detected through screening or symptomatically will not be of interest
Intervention	Not applicable	Not applicable
Outcomes	Patient pathway: • Incidence/prevalence/rate of IPN discovery • Patient demographics and clinical characteristics at time of IPN discovery (including risk factors) • Source of IPN detection (when/how/where/who) • Diagnostic tests at time of detection of IPN • Time between first scan and potential diagnosis of IPN • Time to treatment and type of treatments for IPN • Rates and types of subsequent testing/investigations • Route of follow-up • Follow-up responsibility (i.e., who is accountable/most responsible provider) • Rates of loss to follow-up Definition/IPN classification: • IPN definition/classification (i.e., nodule size, appearance) Guidelines and systems used in Canada: • List of guidelines and systems used in Canada (local and international) for IPN management • Provider understanding or awareness of IPN management guidelines and adherence to guidelines/systems Patient clinical and economic outcomes as a result delayed/inadequate IPN management: • Incidence of lung cancer development • Lung cancer staging (proportion of Stage I-IV cancer diagnoses) • Survival rate • Time to lung cancer progression • Lung cancer mortality rates and all-cause mortality • Cost of IPN management (per patient) and cost of follow-up (per patient) • Other relevant clinical and economic outcomes Reported unmet needs for IPN management in Canada: • Barriers to patient follow-up in Canada and reasons for inappropriate IPN management • Other IPN management obstacles and (if reported) recommendations for patient management in Canada Initiatives/activities launched outside of Canada: Recommendations, methods used, and lessons learned	Outcomes not of interest
Study types	• Observational studies of any type • Real-world data studies • Case studies/reports • Diagnostic/treatment guidelines • Reviews • Expert opinion pieces • Government or KOL-led whitepapers	• Randomized controlled trials • Non-randomized controlled trials • Single arm trials • Letters/editorials
Language	English	Other languages[†]
Publication year	From 2010–2023	Before 2010

[†], studies with English abstracts where the full-text articles are in non-English language were excluded from the review. IPN, incidental pulmonary nodule; KOL, key opinion leader.

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