Educational Needs Assessment to Identify the Decision-making Patterns of Clinicians Managing Patients with Hematologic Malignancies

Provided for Pfizer Medical Education Group

CE Outcomes, LLC

University of Nebraska Medical Center, Center for Continuing Education

July 19, 2013

Project overview

Purpose: The purpose of this study was to assess current practice patterns, perceptions, and perceived barriers of oncologists (community-based and academic), oncology nurses, and pathologists managing patients with hematologic malignancies in order to identify and prioritize ongoing educational needs.

Target groups and sample size:

- US-practicing oncologists, oncology nurses, and pathologists who manage patients with chronic lymphocytic leukemia (CLL), follicular lymphoma (FL), and chronic myelogenous leukemia (CML)
  - Community-based oncologists (n = 84)
  - Academic oncologists (n = 66)
  - Oncology nurses (n = 75)
  - Pathologists (n = 100)

Methods:

- Literature review for pertinent published practice pattern studies within the past 5 years
- Three nominal group technique (NGT) focus groups to examine the barriers to optimally managing patients with hematologic malignancies
- Case-based surveys developed with clinical experts and distributed via email in June-July 2013
- Qualitative, confirmatory interviews with three oncologists, two oncology nurses, and two pathologists who manage patients with CLL, follicular lymphoma, and CML to provide expert perspective on survey results

Respondent Demographics: Oncologists

		Community n = 84	Academic n = 66
Degree, %	MD/DO	84 (100%)	66 (100%)
Physician specialty, %	Medical oncology	19 (23%)	6 (9%)
	Hematology/Oncology	65 (77%)	60 (91%)
Present employment, %	Solo practice	15 (18%)	-
	Group practice	63 (75%)	12 (18%)
	Medical School	-	37 (56%)
	Non-government hospital	4 (5%)	16 (24%)
	Government	2 (2%)	1 (2%)
Major professional activity, %	Direct patient care activities	84 (100%)	66 (100%)
Male, %		68 (81%)	46 (70%)
Medical school in the US, %		49 (58%)	35 (53%)
Years since medical school, mean (SD)		27 (10)	15 (11)
Patients seen per week, mean (SD)		98 (44)	56 (28)
Patients seen per week with CLL, mean (SD)		9 (6)	6 (7)
Patients seen per week with FL, mean (SD)		8 (6)	6 (8)
Patients seen per week with CML, mean (SD)		5 (4)	5 (7)

Respondent Demographics: Pathology

		Pathology n = 54	Hematopathology n = 46
Degree, %	MD/DO	54 (100%)	46 (100%)
Physician specialty, %	Pathology	54 (100%)	-
	Hematopathology	-	46 (100%)
Present employment, %	Solo practice	1 (2%)	-
	Group practice	41 (76%)	24 (52%)
	Medical School	5 (9%)	11 (24%)
	Non-government hospital	5 (9%)	8 (17%)
	Government	2 (4%)	2 (4%)
	Other	-	1 (2%)
Major professional activity, %	Direct patient care activities	52 (96%)	42 (91%)
	Administrative activities	1 (2%)	1 (2%)
	Medical education	1 (2%)	1 (2%)
	Medical research	0	2 (4%)
Male, %		36 (67%)	31 (67%)
Medical school in the US, %		45 (83%)	33 (72%)
Years since medical school, mean (SD)		23 (11)	18 (9)
Samples evaluated per week, mean (SD)		12 (16)	49 (34)
CLL samples evaluated per week, mean (SD)		18 (18)	15 (13)
FL samples evaluated per week, mean (SD)		13 (11)	11 (10)
CML samples evaluated per week, mean (SD)		6 (6)	7 (7)

Respondent Demographics: Nurses

		Nurses n = 75
Licensure, %	RN	62 (83%)
	NP	13 (17%)
Degree, %	BSN	33 (44%)
	MSN	20 (27%)
	ASN	11 (15%)
	Diploma	7 (9%)
	Other	4 (5%)
Specialty, %	Oncology	75 (100%)
Work environment, %	Private oncology practice	19 (25%)
	Academic institution	22 (29%)
	Outpatient infusion center	18 (24%)
	Inpatient oncology unit	15 (20%)
	VA	1 (1%)
Male, %		1 (1%)
Nursing school in the US, %		73 (97%)
Years since nursing school, mean (SD)		23 (9)
Patients seen per week, mean (SD)		73 (83)
Patients seen per week with CLL, mean (SD)		5 (7)
Patients seen per week with FL, mean (SD)		7 (11)
Patients seen per week with CML, mean (SD)		5 (8)

Study Focus: Hematologic Malignancies

Results of the study have been organized into the following diseases for synthesis and reporting:

CLL

Follicular Lymphoma

CML

Study Focus: Hematologic Malignancies

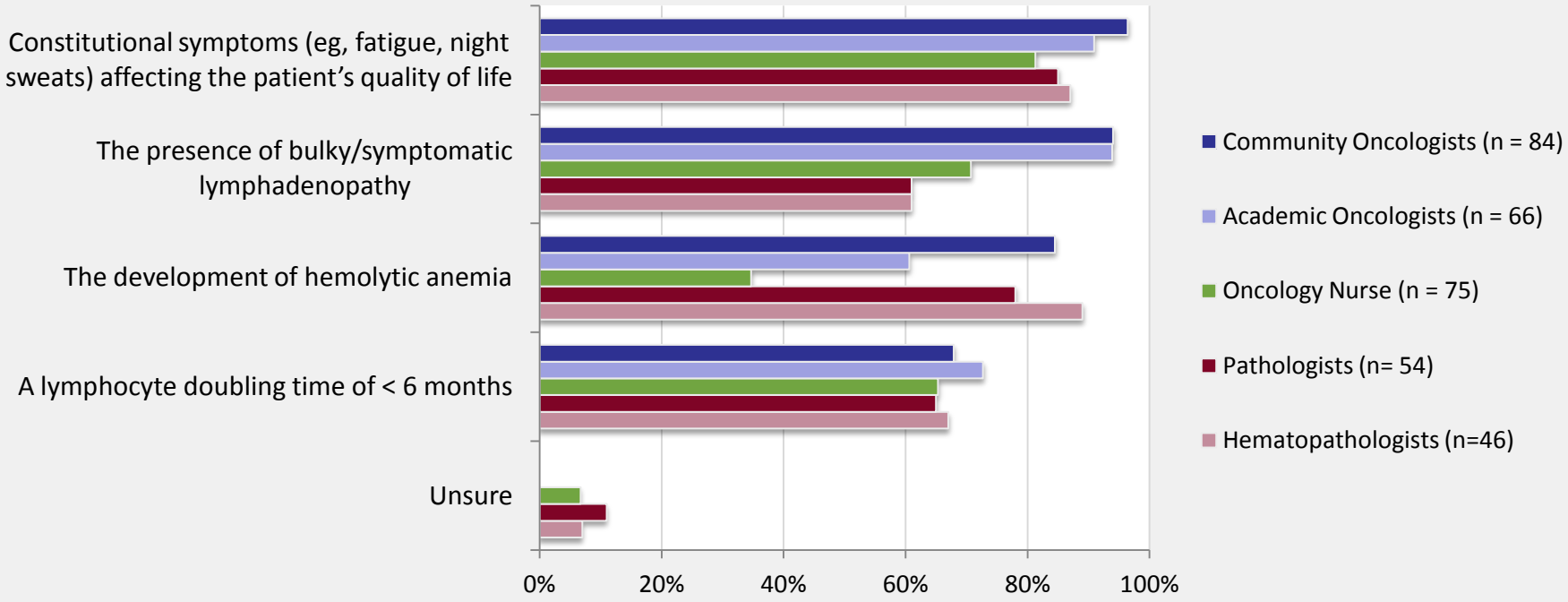
CLL

Follicular Lymphoma

CML

Factors in Treatment Decision for CLL

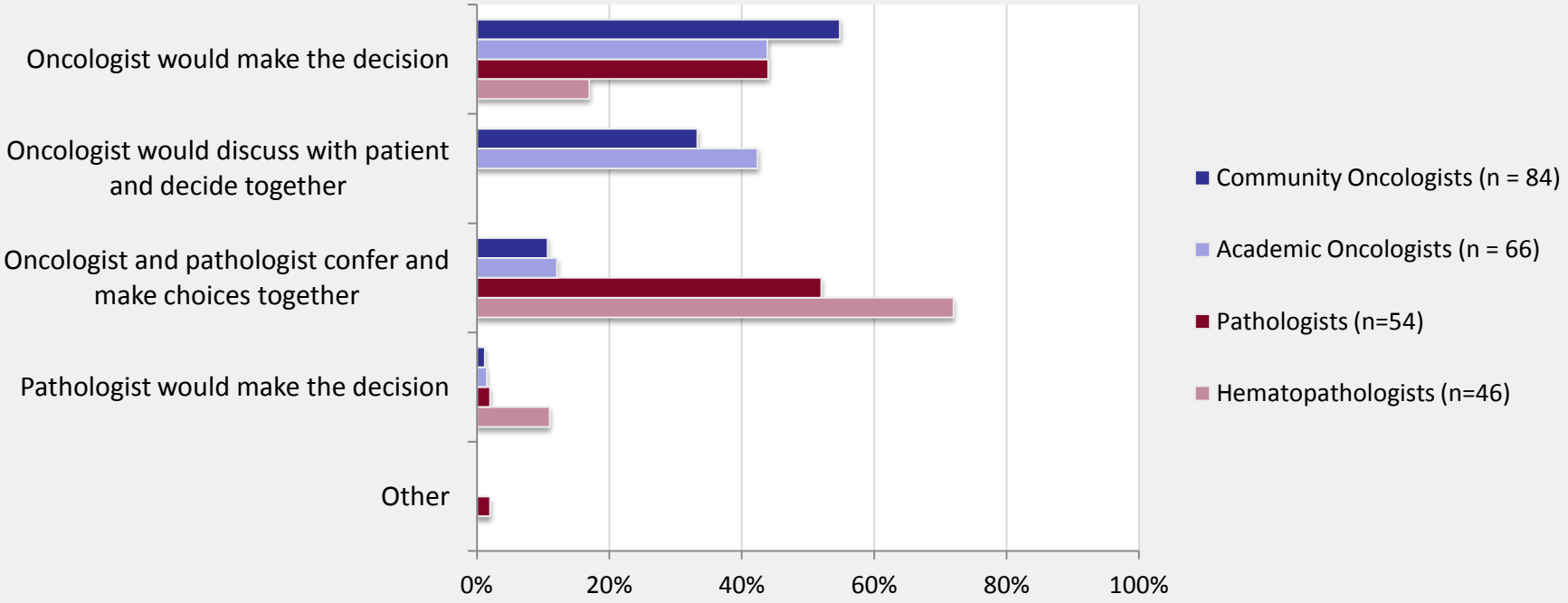
Which of these do you consider/should be considered when deciding whether to treat patients with CLL?



- The majority of oncologists appropriately considered all four factors.
- Over 1/3 of academic oncologists , 2/3 of oncology nurses did not consider hemolytic anemia, an indicator not to initiate CLL treatment if no other indicators are present.
- Almost a third did not consider lymphocyte doubling time, although this is a well-established indicator of proliferation.
- Pathologist responses were similar to nurse responses except the greater numbers considering hemolytic anemia.

Pathology Consultation for Selecting Prognostic Markers

How would the decision be made about what tests to perform? (select only one)



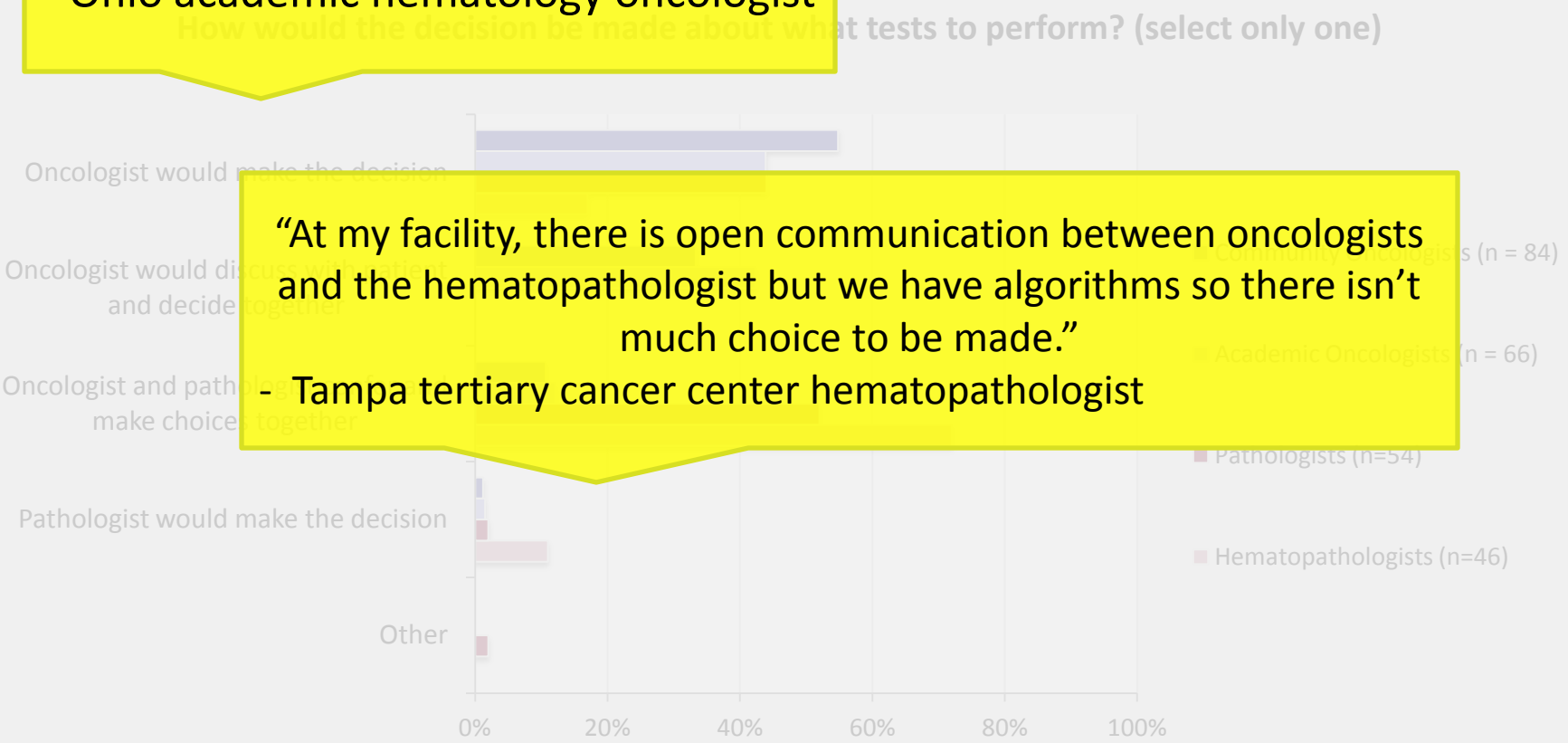
- Few oncologists (< 15%) consult with a pathologist when deciding on tests to perform for a patient with CLL; this is likely a reflection of institutional protocols/algorithms in place for test selection.
- Most pathologists indicate that they do confer with the oncologist in selecting tests , although from all indications this conference is likely very limited.

Pathology Consultation for Selecting Prognostic Markers

Few oncologists (< 15%) consult with a pathologist when deciding on tests to perform for a patient with CLL; this is likely a reflection of institutional protocols/algorithms in place for test selection.

"It's like an algorithm here."

- Ohio academic hematology oncologist

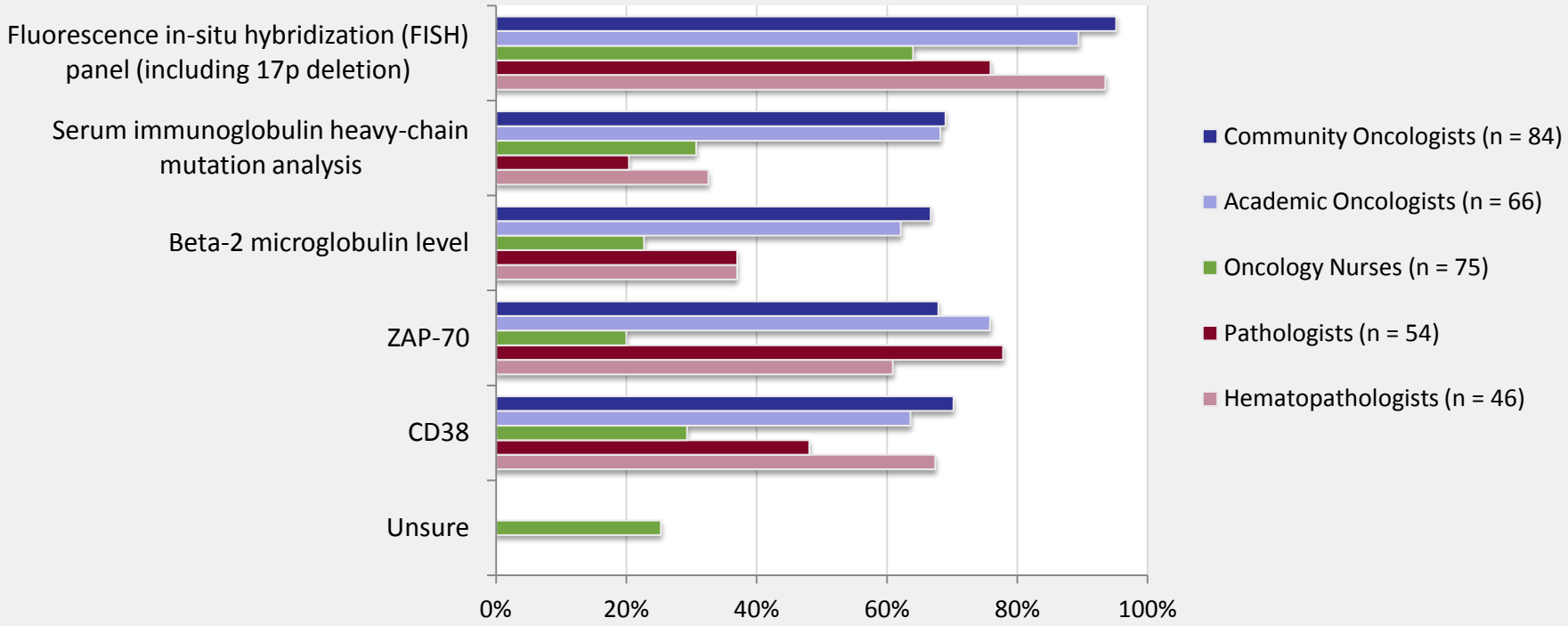


"At my facility, there is open communication between oncologists and the hematopathologist but we have algorithms so there isn't much choice to be made."

- Tampa tertiary cancer center hematopathologist

Prognostic Markers for CLL

What prognostic markers would you order for a patient with clinically stable CLL?

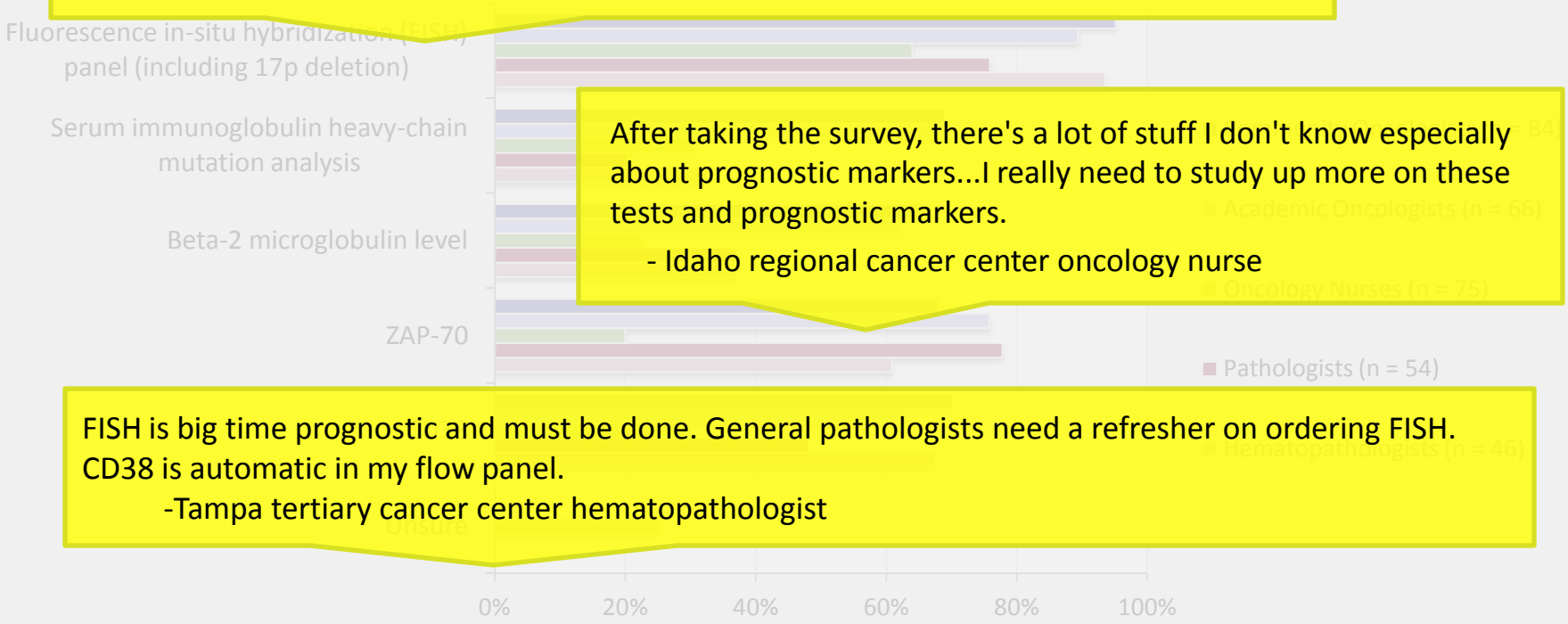


- Oncologists are most likely to include a FISH panel with 17p del to assess prognosis for a patient with CLL, and almost equally likely to include ZAP-70, CD38, B2M, and serum Ig HC mutation, even though reproducibility of ZAP-70 and CD38 is an issue.
- Pathologists were equally likely to include a FISH panel (with 17p deletion) and ZAP-70 ; review of the role of FISH testing in prognosis is needed.
- Nurse responses reflect the lack of exposure to biomarkers in nursing continuing education.

Prognostic Markers for CLL

Reproducibility of CD38 is an issue, it varies over time even within a patient, ZAP-70 has technical reproducibility problems, results are hard to consistently reproduce.

- Ohio academic hematology oncologist



After taking the survey, there's a lot of stuff I don't know especially about prognostic markers...I really need to study up more on these tests and prognostic markers.

- Idaho regional cancer center oncology nurse

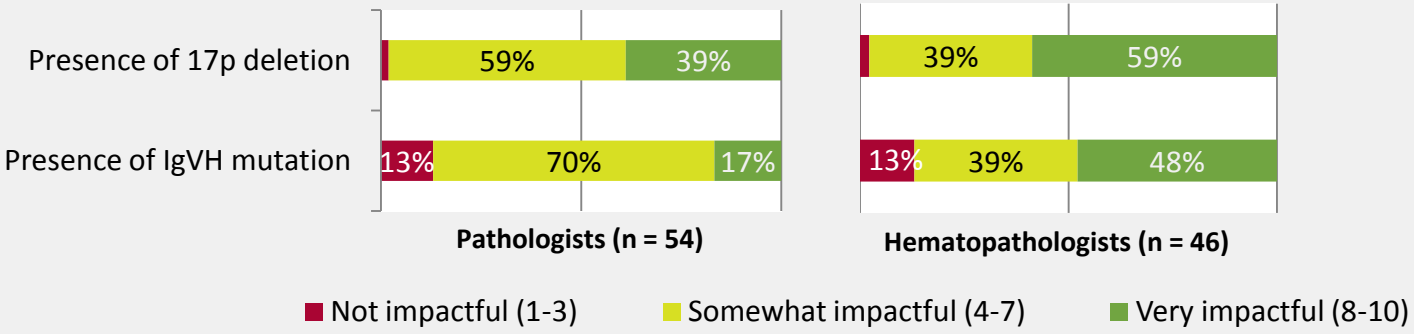
FISH is big time prognostic and must be done. General pathologists need a refresher on ordering FISH. CD38 is automatic in my flow panel.

-Tampa tertiary cancer center hematopathologist

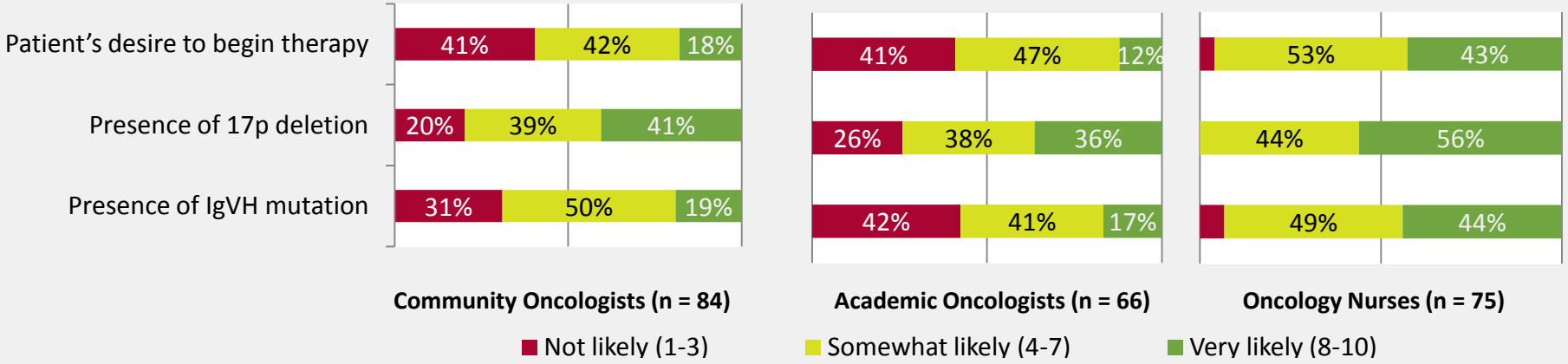
#1 barrier indentified in NGT session by oncology nurses for education to address: understanding pathology/molecular testing results and how they impact treatment

Influences in Deciding When to Initiate CLL Therapy

What impact would the following have on the patient's management?

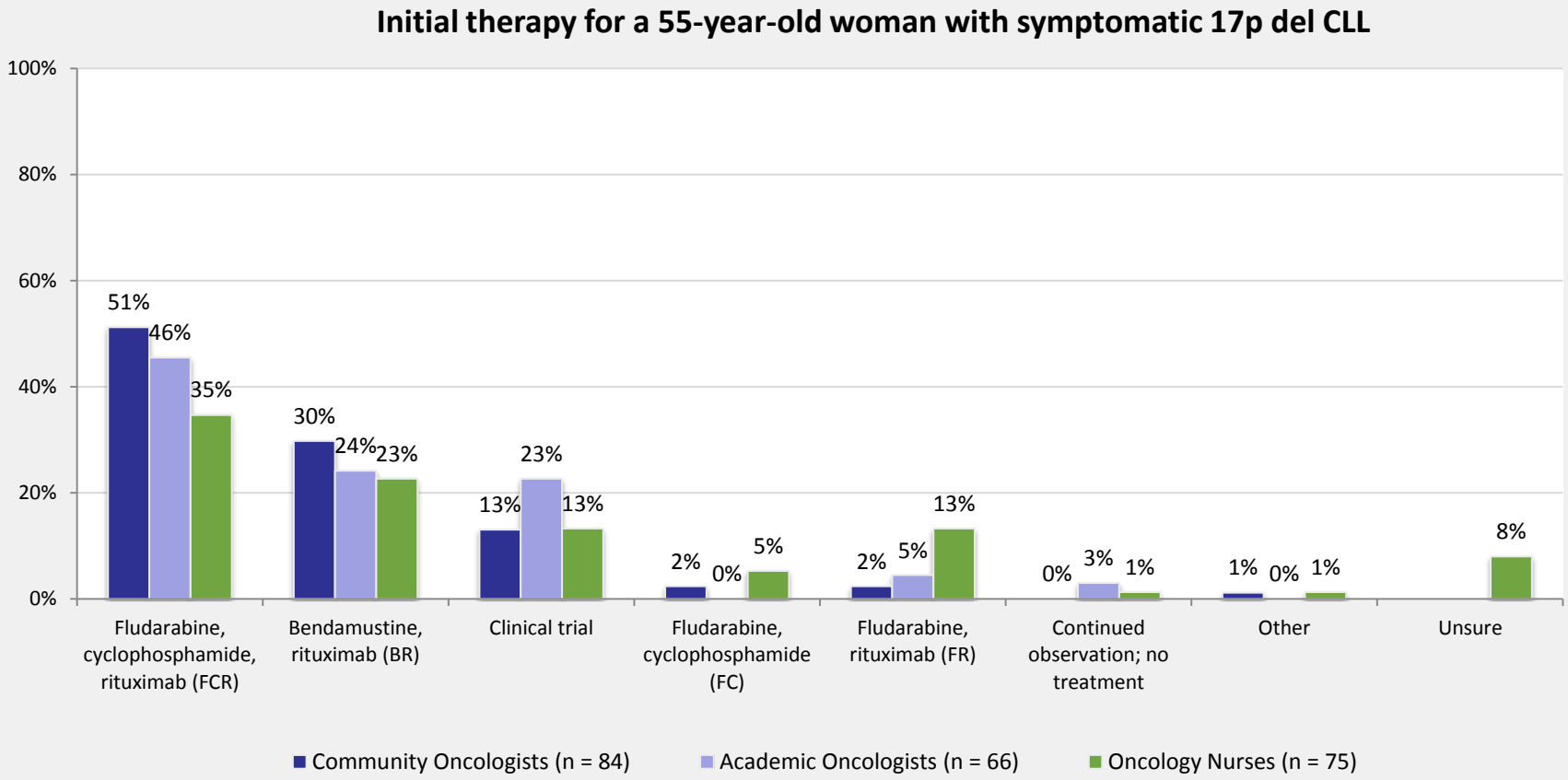


How likely are you to begin treatment based on each of the following?



- Oncologist clinicians are more likely to initiate CLL treatment if 17p deletion is present rather than for the presence of IgVH mutation; *absence* of IgVH mutation is more predictive of prognosis than its presence.
- Hematopathologists consider both tests of more impact than do general pathologists; clarification of the clinical relevance of these results may be helpful.

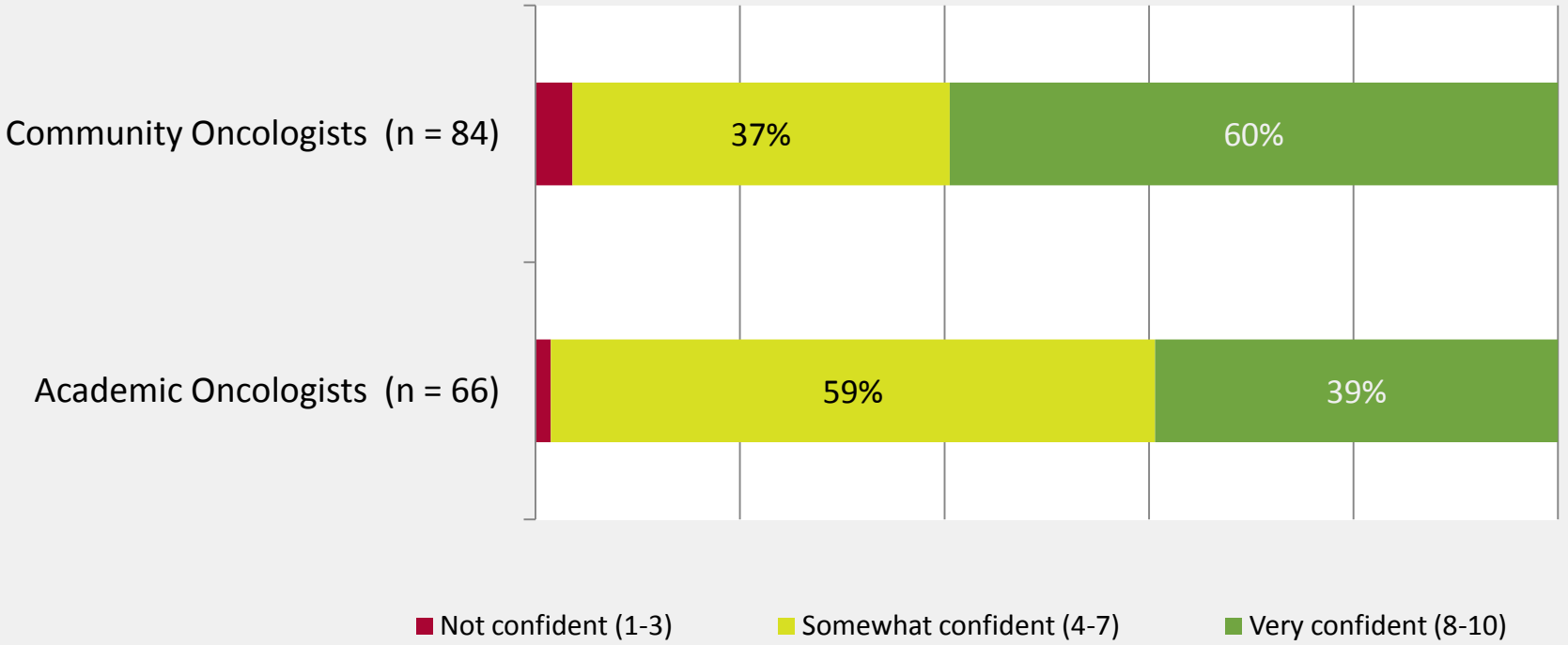
Initial Therapy for 17p del CLL



- Oncology clinicians are making evidence-based treatment selections for CLL but are more likely to select FCR than BR as initial therapy for a patient with symptomatic 17p del CLL.
- Academic oncologists are the most likely to opt for a clinical trial, likely based on recent positive trial results.

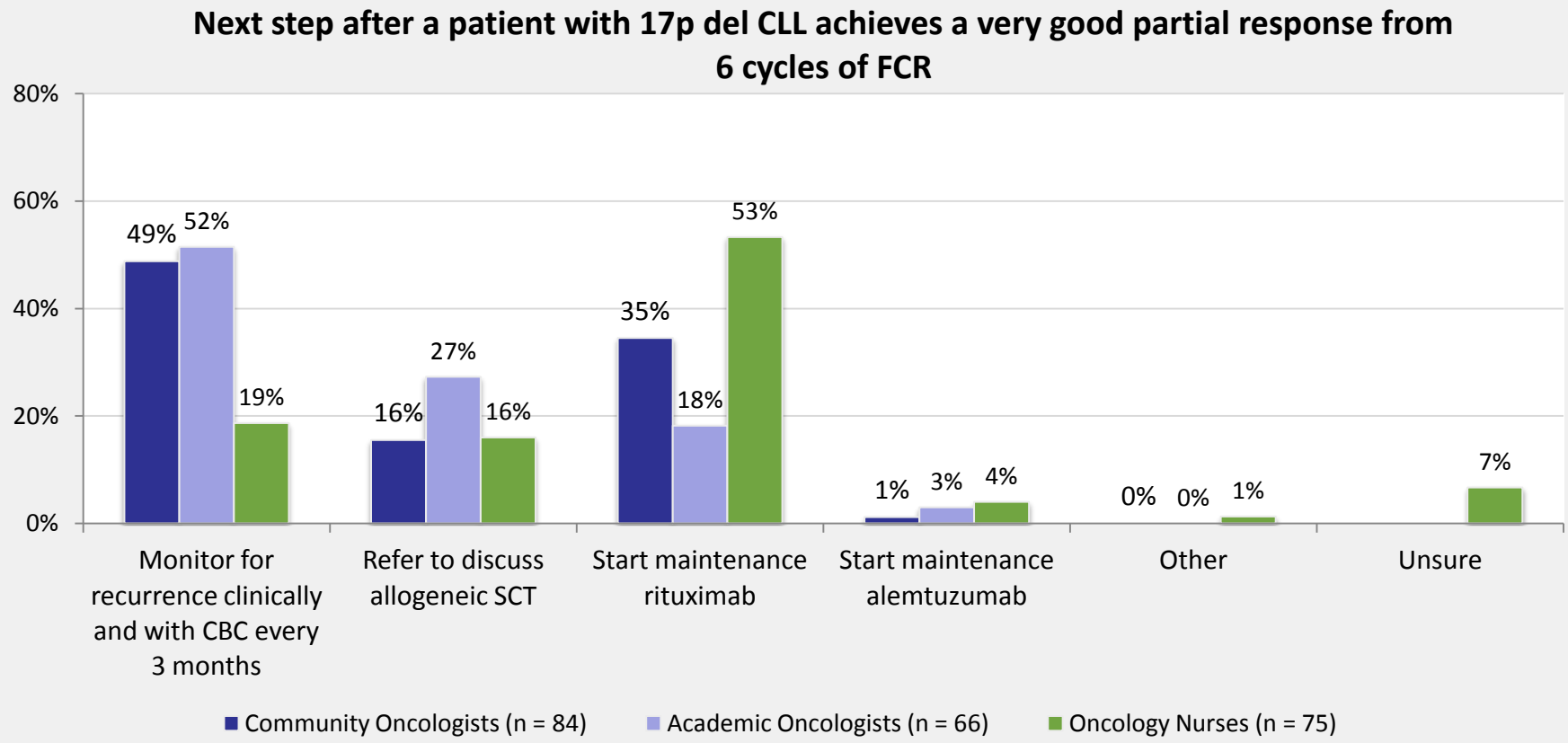
Confidence in Efficacy of 1st line CLL Therapy

How confident are you in the efficacy of your treatment selections at this stage?



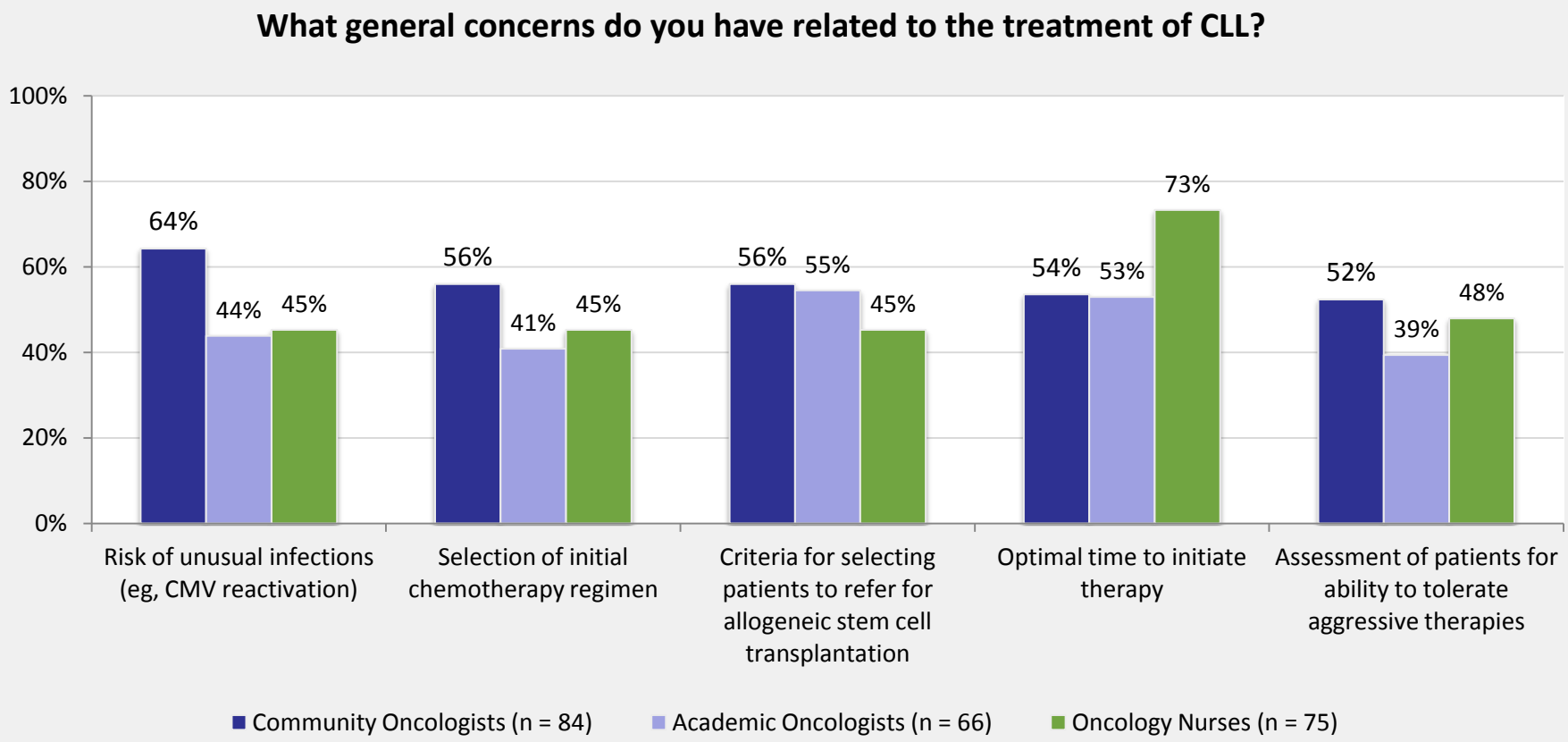
- Community oncologists were much more confident than academic oncologists in the efficacy of the treatment selected for a patient with 17p del CLL. A third of the "very confident" academic oncologists, but only 8% of the community oncologists, selected a clinical trial for the patient, suggesting a lack of confidence by academics in the efficacy of currently available therapies.

Management After VGPR From CLL Therapy



- For a patient with CLL who achieves a VGPR from FCR, half of oncologists would monitor the patient for recurrence rather than actively treat or refer for SCT.
- Notable portions of oncologists (and most nurses) selected maintenance rituximab even though evidence does not support its use in the 17p deletion setting.

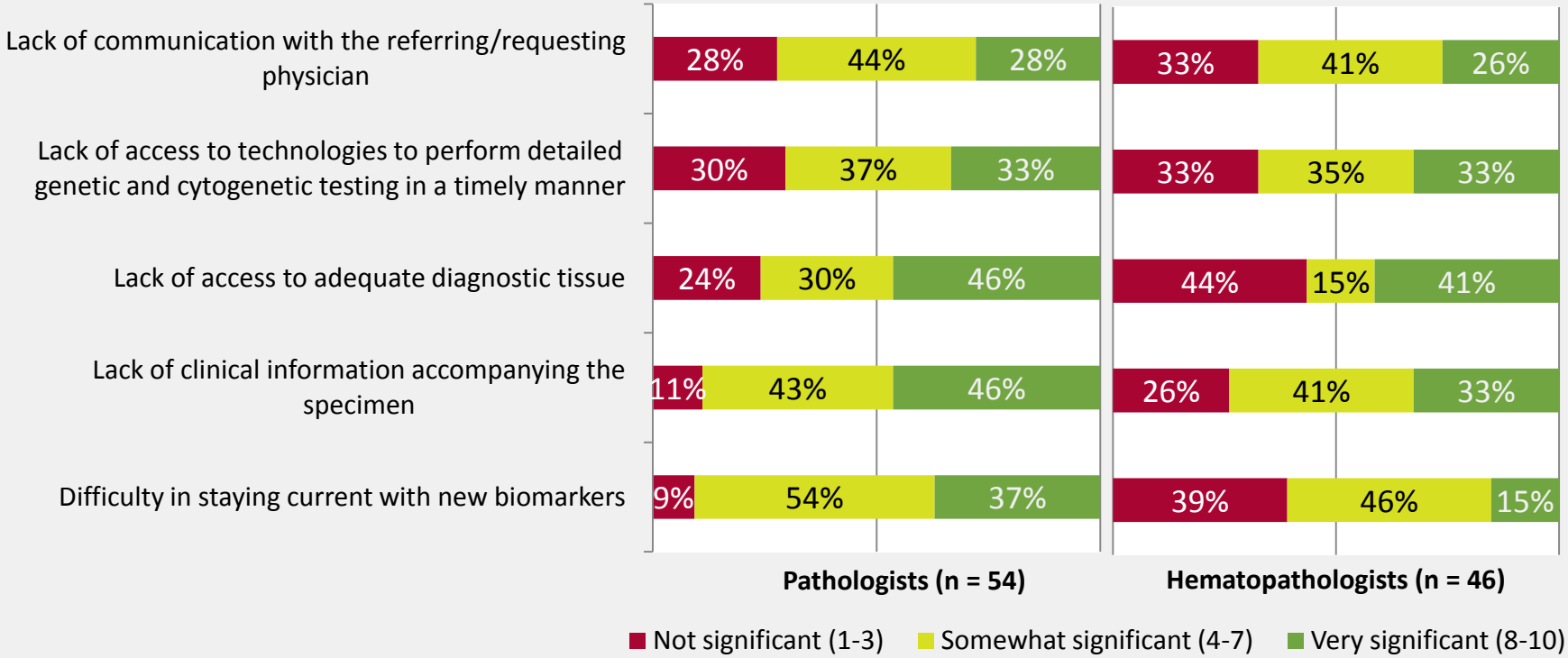
Issues of Concern in Treating CLL



- In assessing areas of concern regarding CLL treatment, community oncologists were most concerned with infection, while academic oncologists were most concerned with criteria for SCT selection, and nurses were most concerned with optimal time to initiate therapy.
- There was no strong consensus on any specific issue which may reflect relative comfort in treating patients with CLL.

Pathology Barriers to Optimal CLL Diagnosis

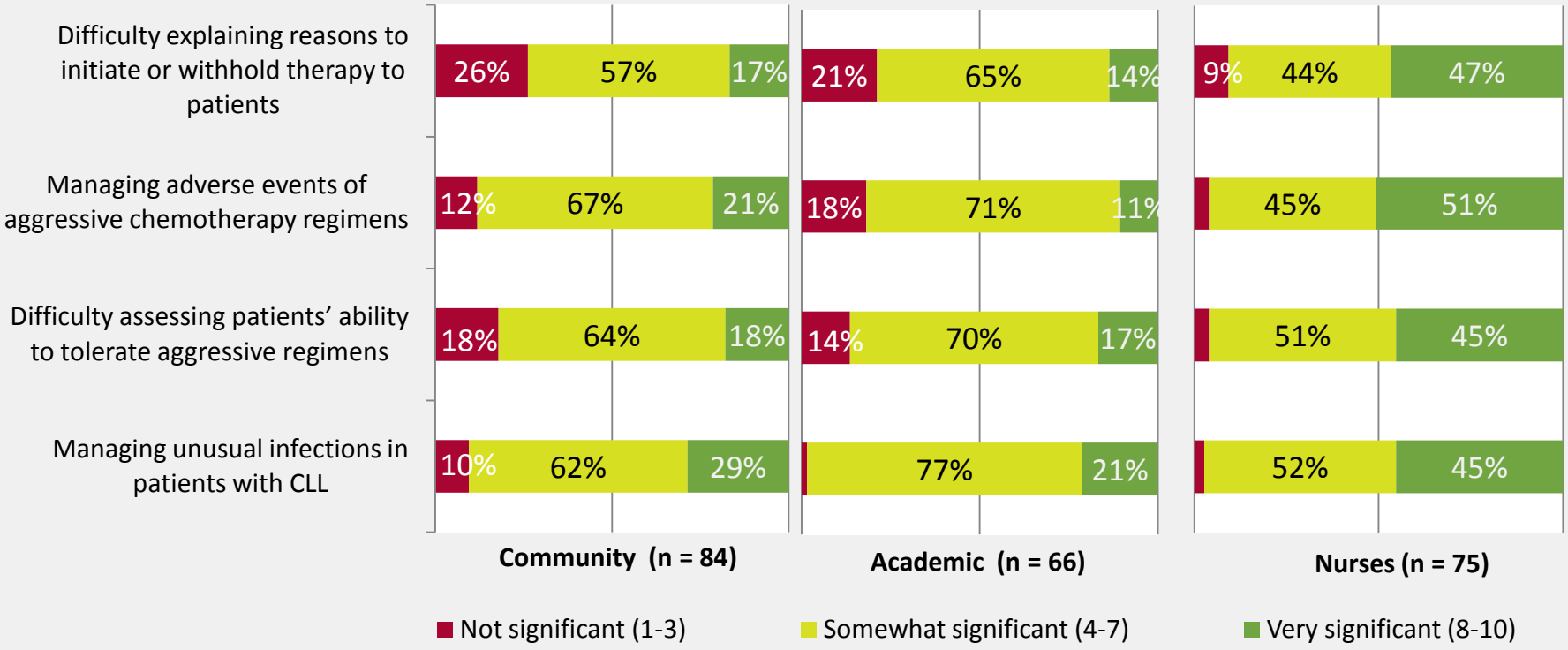
How significant are each of the following barriers to the optimal diagnosis of CLL?



- Logistical issues (lack of adequate tissue sample and accompanying clinical information with sample) are the primary barriers identified by both groups of pathologists.
- More general pathologists than hematopaths have difficulty staying current with new biomarkers, which may suggest a lack of access/exposure to new biomarker information for these physicians.

Oncology Barriers to Optimal CLL Management

How significant are each of the following barriers to the optimal management of CLL?



- Neither community nor academic oncologists appear encumbered by any specific barrier to managing patients with CLL.
- Oncology nurses were much more likely to perceive the barriers as very significant. Since these barriers were patient-focused, (managing adverse events, discuss treatment strategy, assessing tolerability) these results may reflect nurses' greater level of daily patient interaction.

Summary of Findings

CLL

Follicular Lymphoma

CML

- Possible overlooking of factors that can inform when to initiate therapy:
  - Development of hemolytic anemia
  - Doubling time < 6 months
- Nurses are much more likely to consider patient desire in deciding when to initiate therapy
- Very limited use of pathology consultation when deciding on prognostic tests
- Almost a quarter of general pathologists would not include FISH with 17p deletion in initial testing
- Almost all are making evidence-based 1st line treatment selections
  - Academics are much less confident in 1st line efficacy than community oncologists
- A third of community oncologists use maintenance in a setting of limited effectiveness (17p deletion)
- General concern regarding:
  - Infection risk
  - Selection of 1st line therapy
  - When to initiate therapy
  - Criteria for referral for ASCT

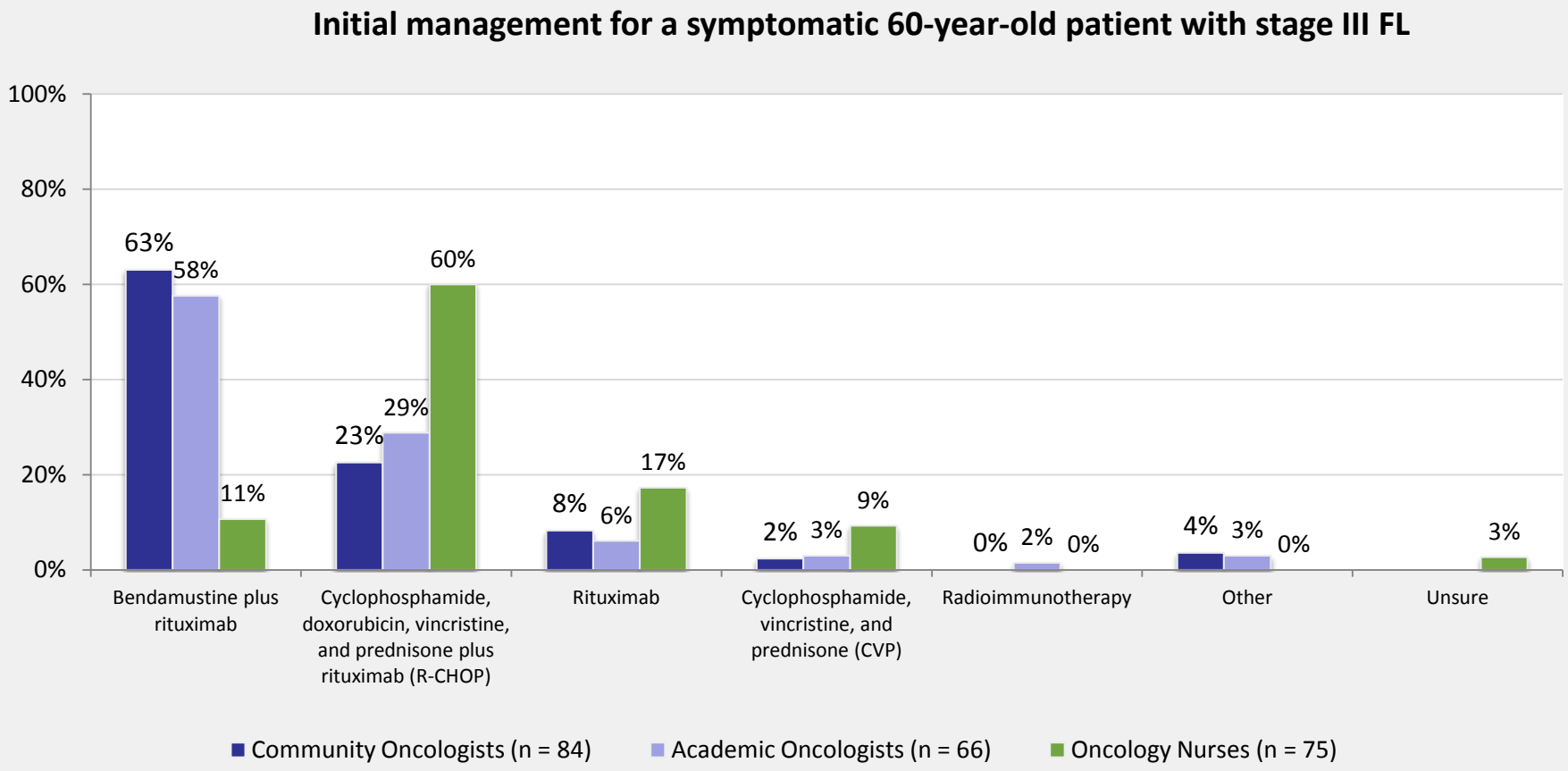
Study Focus: Hematologic Malignancies

CLL

Follicular Lymphoma

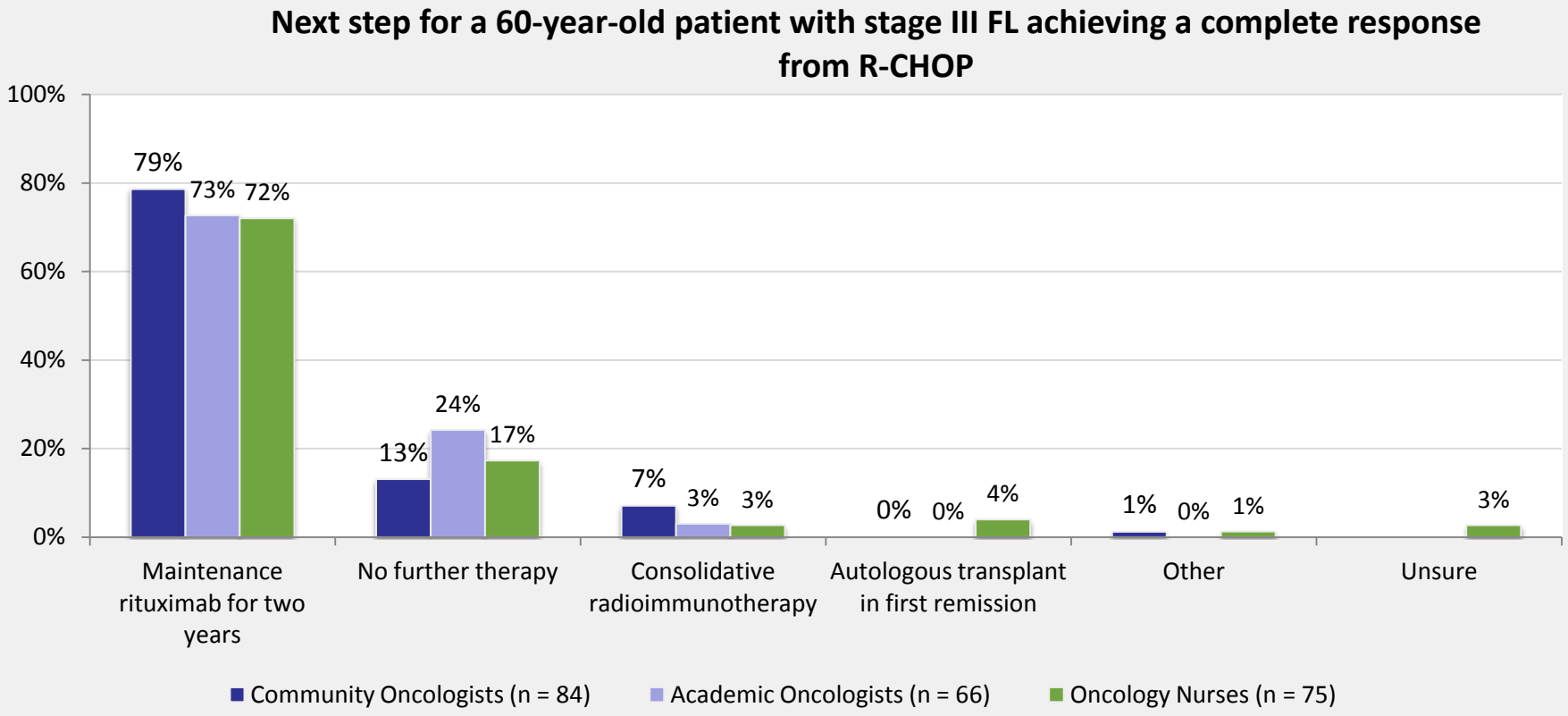
CML

Initial Management of Stage III Follicular Lymphoma



- For a 60-year-old patient with symptomatic FL but in good performance status, although most oncologists would treat with BR, approximately a quarter of oncologists selected the more toxic R-CHOP regimen. This may reflect local standardized approaches across the nation.

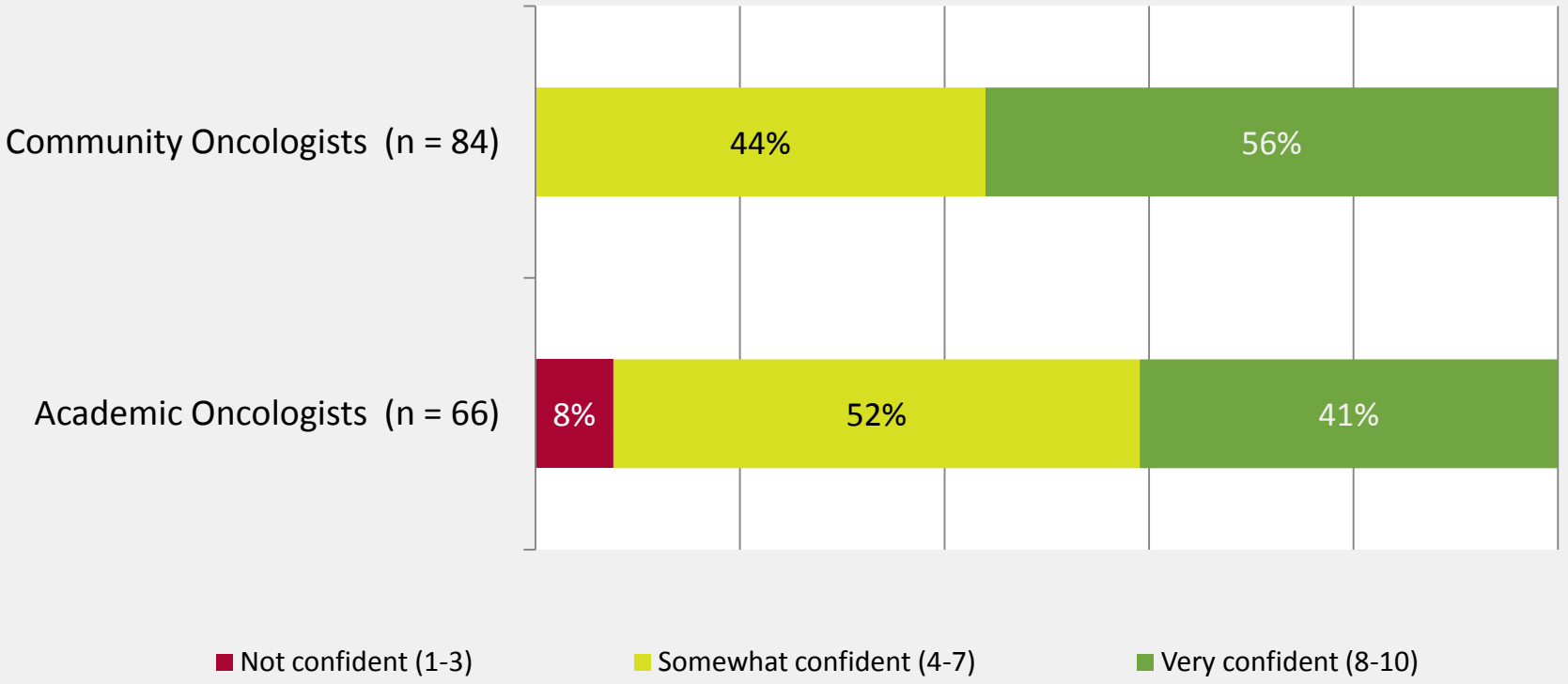
FL Management Following CR From R-CHOP



- For a patient with stage III FL who achieves a complete response with R-CHOP, the majority of oncology clinicians would appropriately initiate rituximab maintenance.
- With a quarter of academic oncologists not selecting maintenance therapy, doubts of the efficacy of maintenance may persist.

Confidence in Efficacy of FL Treatment

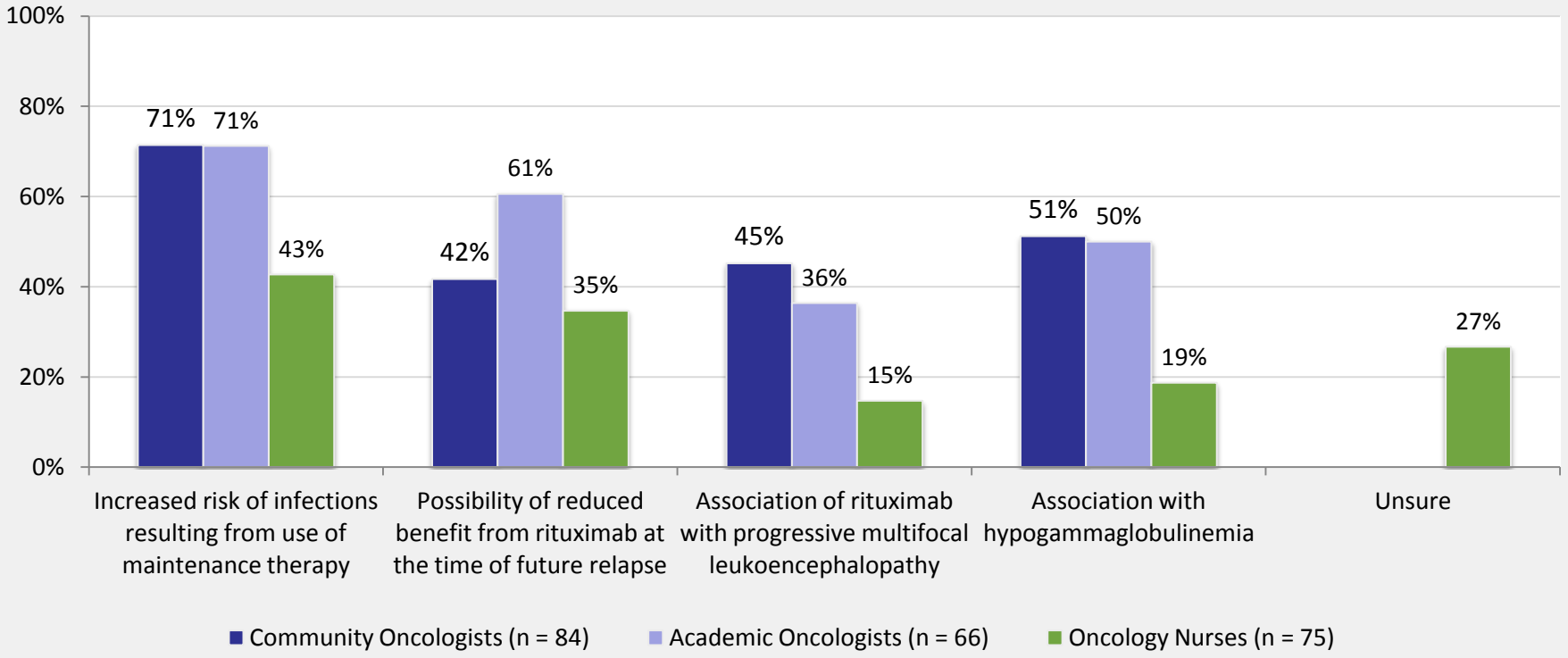
How confident are you in the efficacy of your treatment selections at this stage?



- Similarly to confidence in CLL treatments, community oncologists are more confident in the efficacy of treatments selected for FL than oncologists in academic centers.

Concerns of Rituximab Maintenance for FL

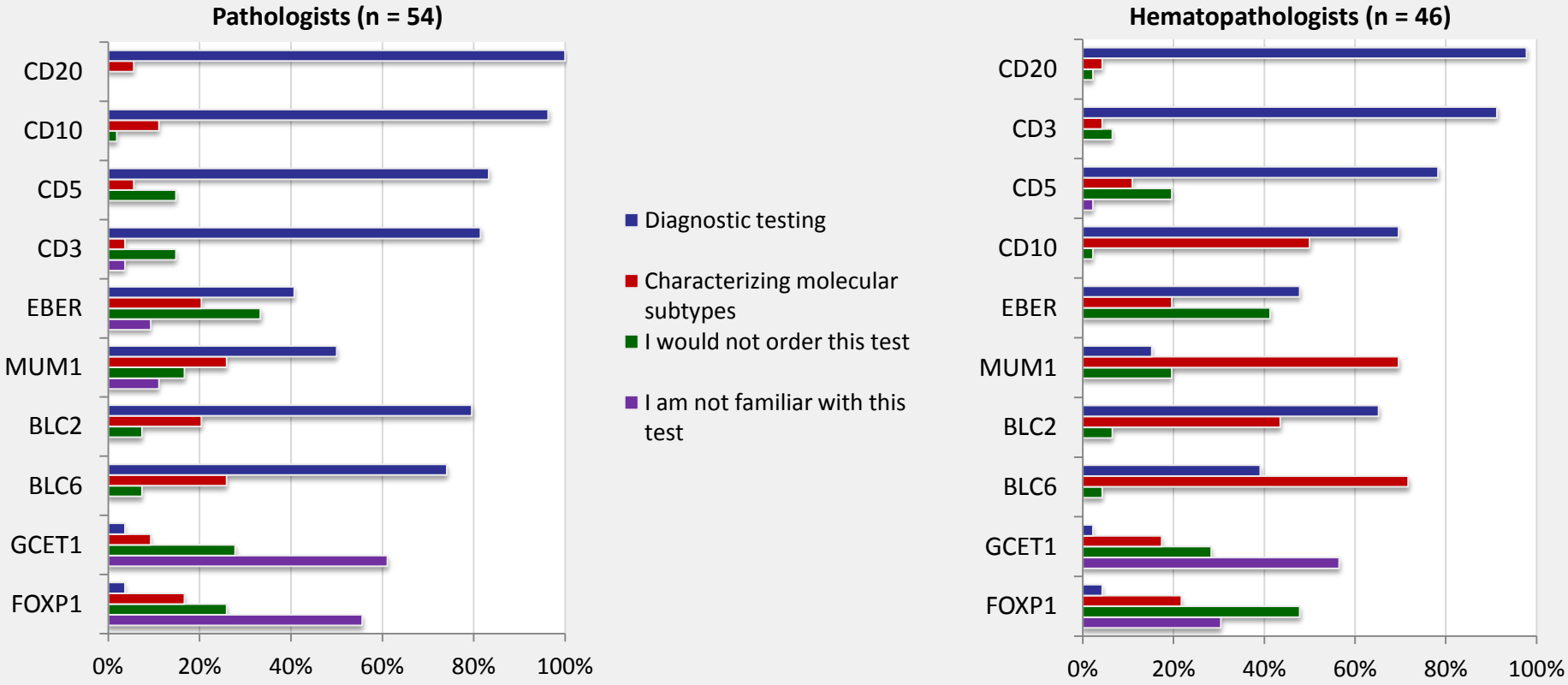
What concerns do you have related to the use of maintenance rituximab in FL?



- Oncologists and nurses are most concerned with infection risks for their patients on maintenance rituximab.
- Academic oncologists are more concerned with reduced benefit of future rituximab use after it is used for maintenance, a perception that may have been reflected in earlier data.
- Nurse results may indicate a lack of awareness of some of the rarer adverse events of rituximab therapy.

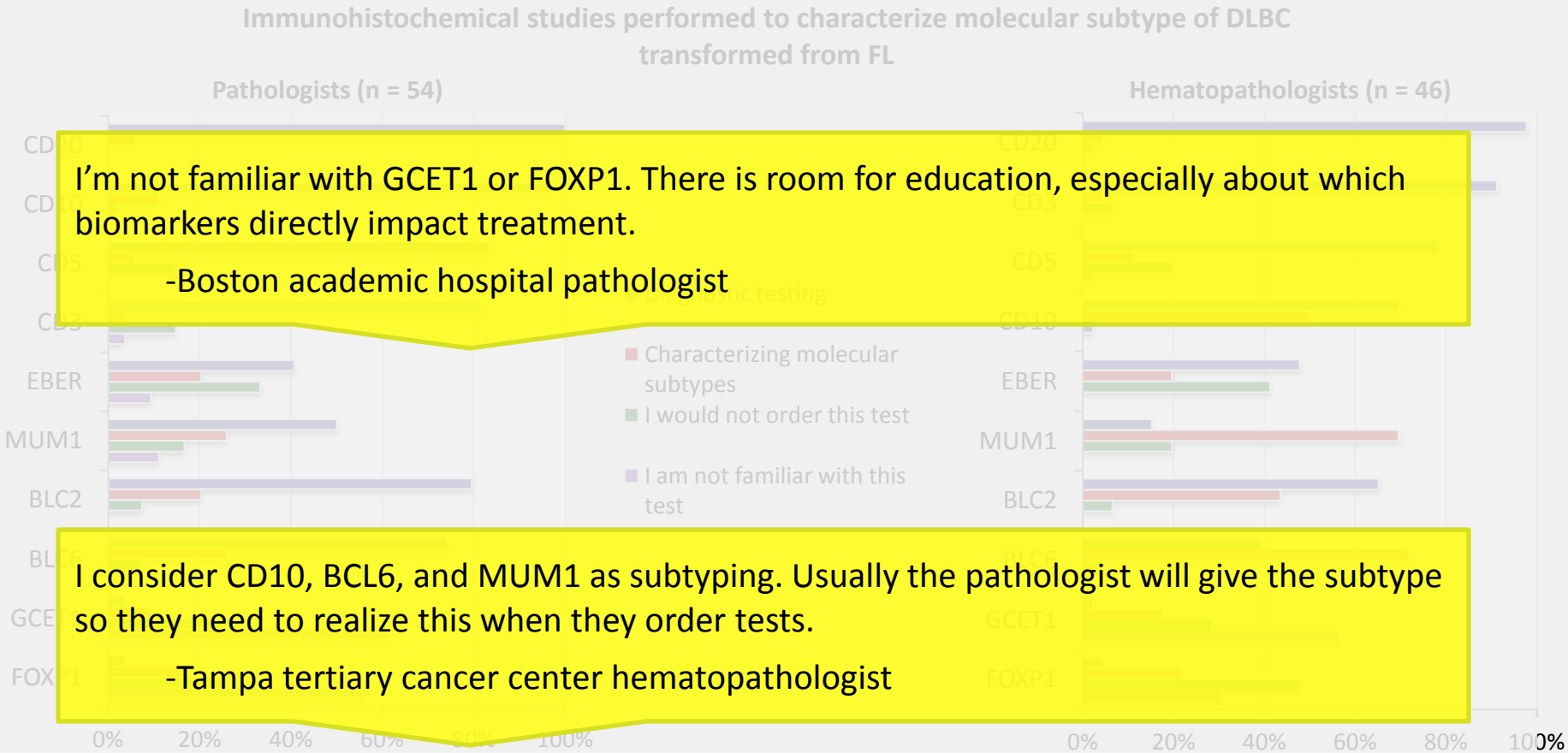
Initial Management of Stage III Follicular Lymphoma

Immunohistochemical studies performed to characterize molecular subtype of DLBC transformed from FL



- Except for CD3, CD5,and CD20, pathology physicians lack clarity on whether specific immunohistochemical tests are for diagnosing or subtyping.
- Hematopaths were much more likely to appropriately consider MUM1, BCL6, and CD10 for subtyping.
- There is low familiarity with GCET1 and FOXP1 among pathology physicians.

Initial Management of Stage III Follicular Lymphoma



I'm not familiar with GCET1 or FOXP1. There is room for education, especially about which biomarkers directly impact treatment.

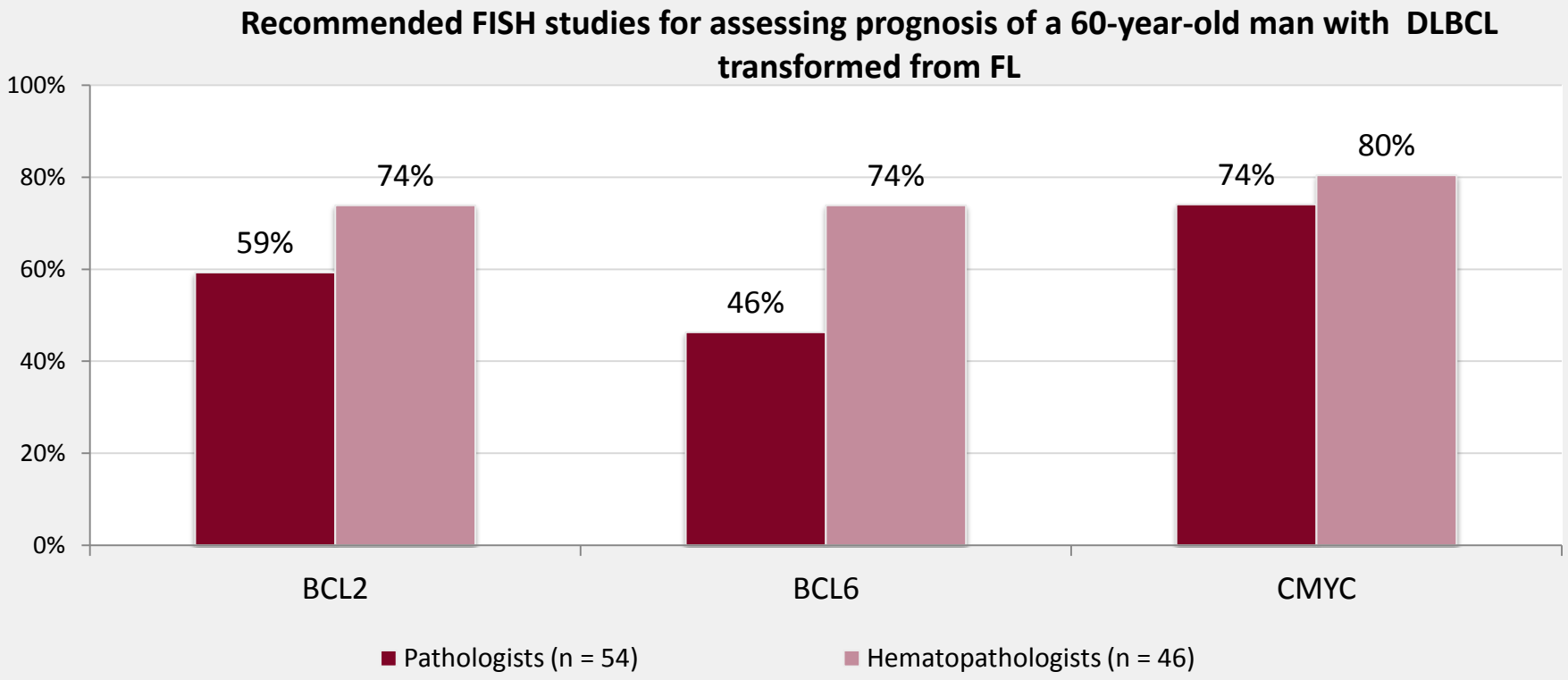
-Boston academic hospital pathologist

I consider CD10, BCL6, and MUM1 as subtyping. Usually the pathologist will give the subtype so they need to realize this when they order tests.

-Tampa tertiary cancer center hematopathologist

- Except for CD3, CD5,and CD20, pathology physicians lack clarity on whether specific immunohistochemical tests are for diagnosing or subtyping.
- Hematopaths were much more likely to appropriately consider MUM1, BCL6, and CD10 for subtyping.
- Low familiarity with GCET1 and FOXP1 among pathology physicians

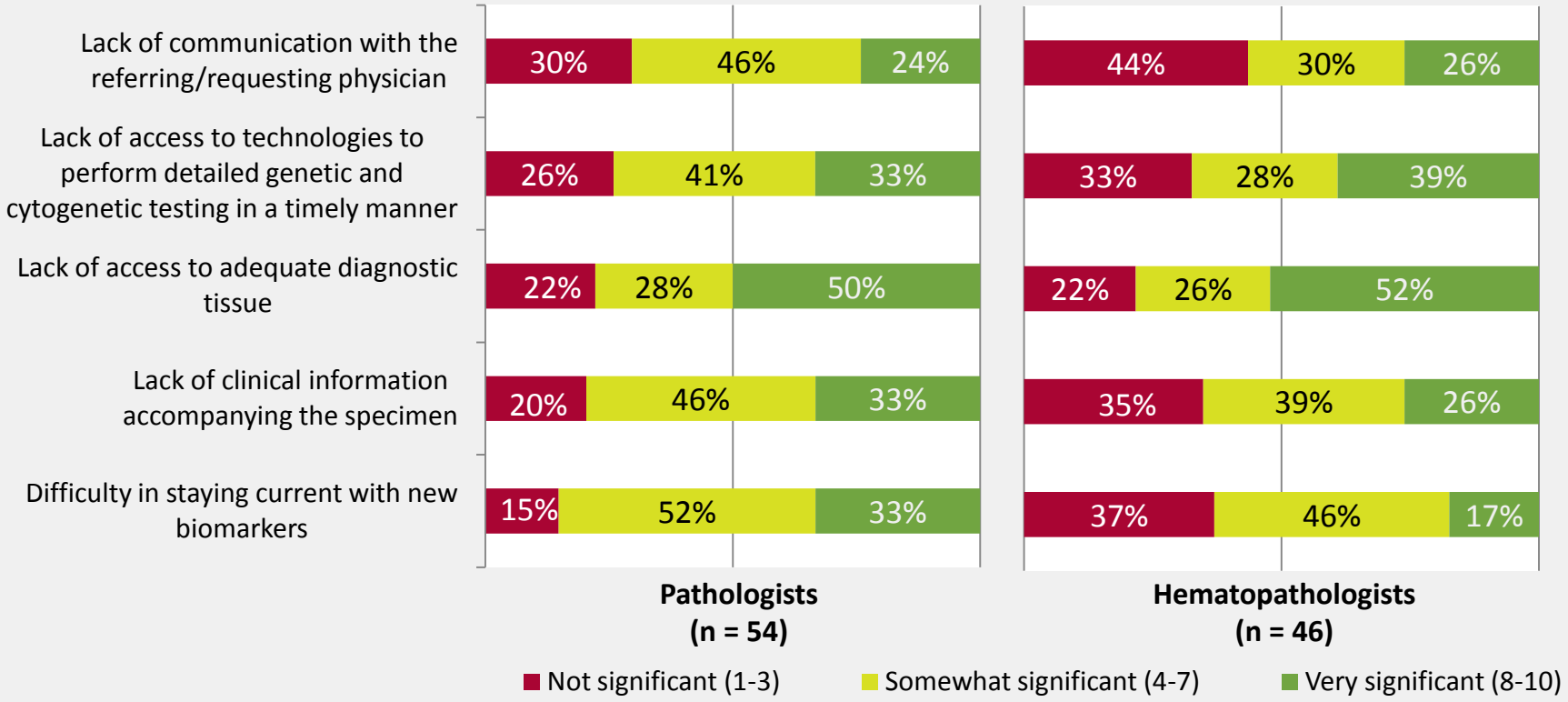
FISH Testing for Prognosis of DLBC Transformed from FL



- Hematopathologists were almost as likely to order BCL2 and BCL6 as they were to order CMYC to assess the prognosis of DLBCL, although BCL2 and BLC6 can be ordered based on the results of

Barriers to Optimal Diagnosis of FL

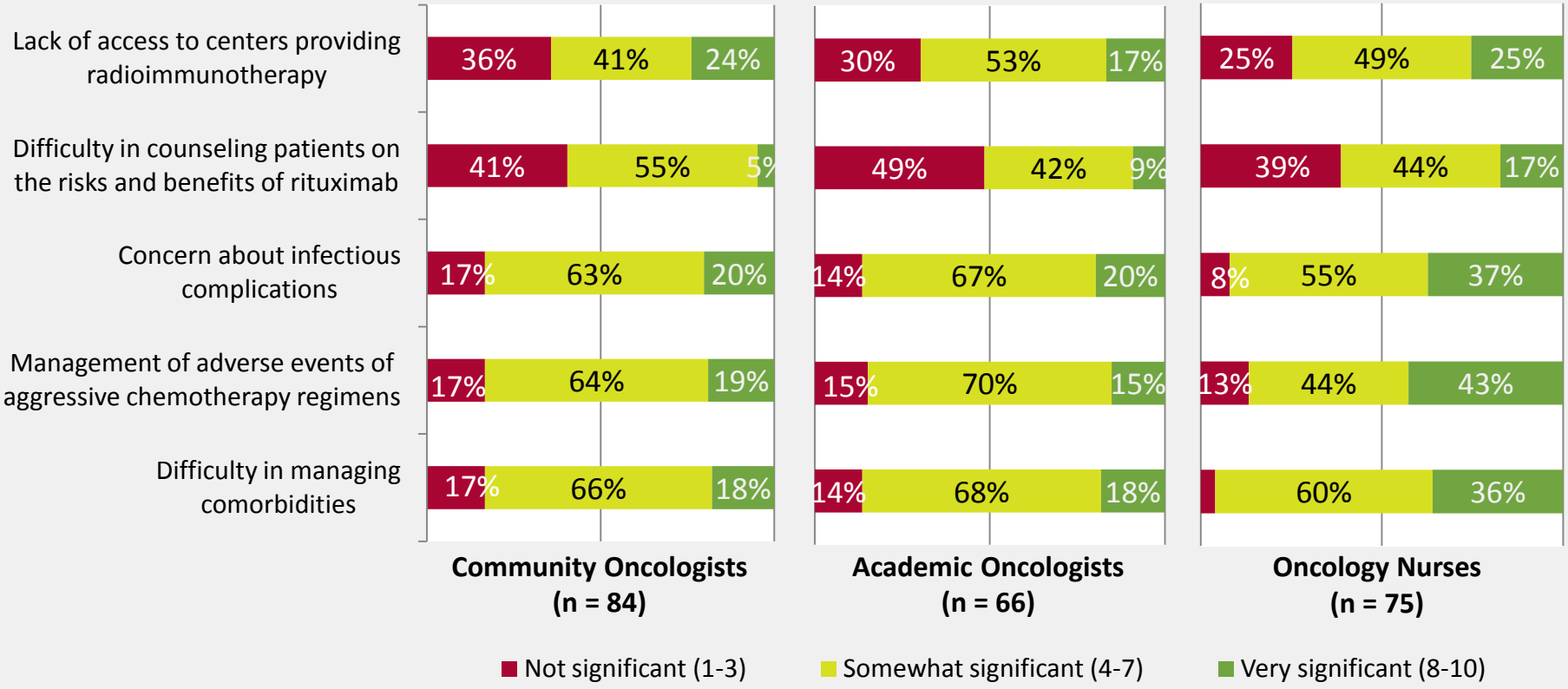
How significant are each of the following barriers to the optimal diagnosis of FL?



- Similarly to CLL barriers, most pathologists and hematopathologists perceive the lack of adequate tissue sample as a very significant barrier to optimal diagnosis of FL
- A third of both groups consider lack of access to technologies for testing in a timely manner as very significant.

Barriers to Optimal Management of FL

How significant are each of the following barriers to the optimal management of FL?



- Similar to perception of barriers in CLL management, most oncologists do not perceive much significance to barriers related to FL management, reflecting a relative level of comfort in managing this type of patient.
- More oncology nurses perceive these barriers as significant, similarly to barriers to CLL management.

Summary of Findings

CLL

Follicular Lymphoma

CML

- Almost all are making evidence-based 1st line selections:
  1. Bendamustine-rituximab (BR)
  2. R-CHOP
- 3 out of 4 put patients on rituximab maintenance after a CR from 1st line treatment
  - Academics are most likely (24%) to opt for no further treatment
- Most academics are not very confident in 1st line/maintenance FL therapies
- More concern regarding risk of infection than risk of PML or hypogammaglobulinemia for rituximab maintenance
  - Most academics concerned over possibility of reduced benefit of rituximab at 1st relapse
- Pathologists lack clarity in which IHC tests are diagnostic and which can differentiate subtypes

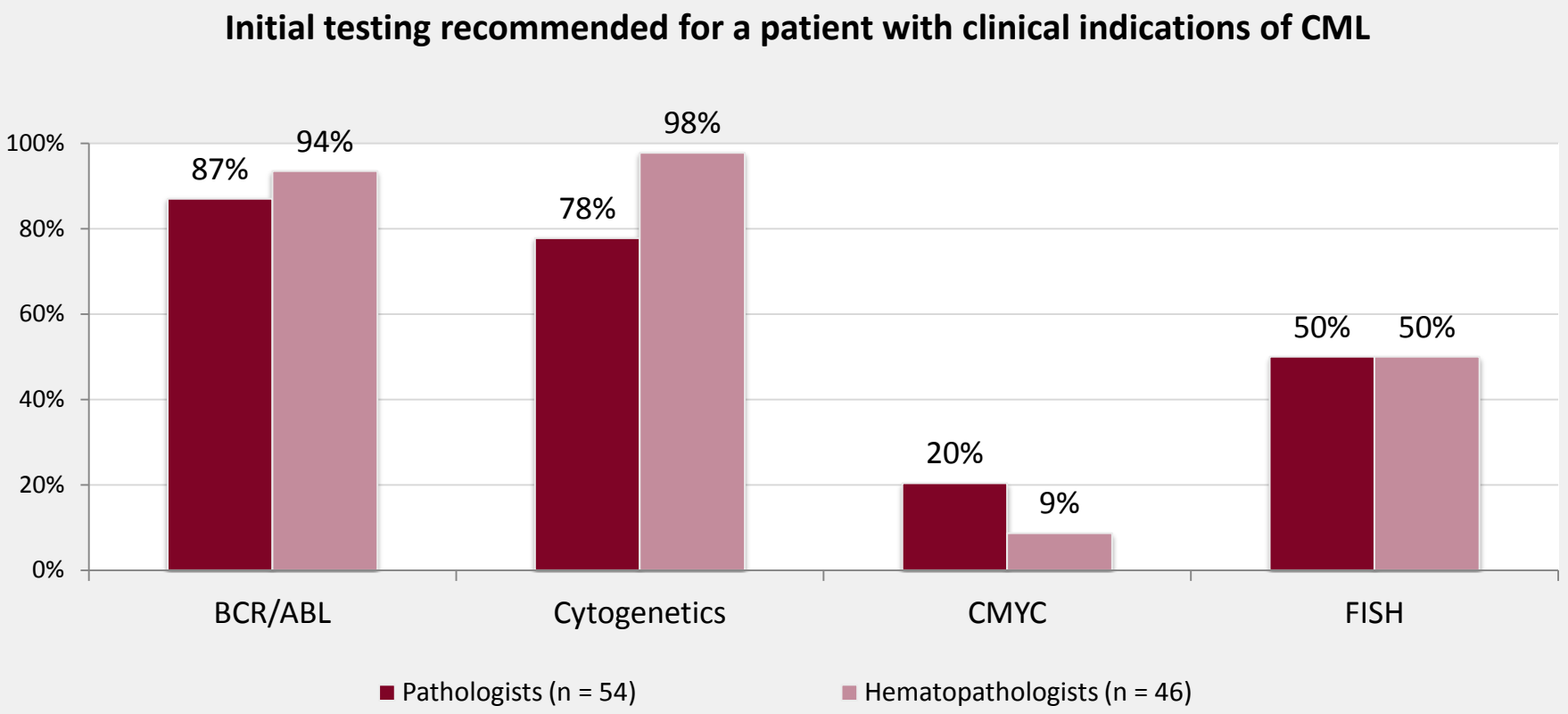
Study Focus: Hematologic Malignancies

CLL

Follicular Lymphoma

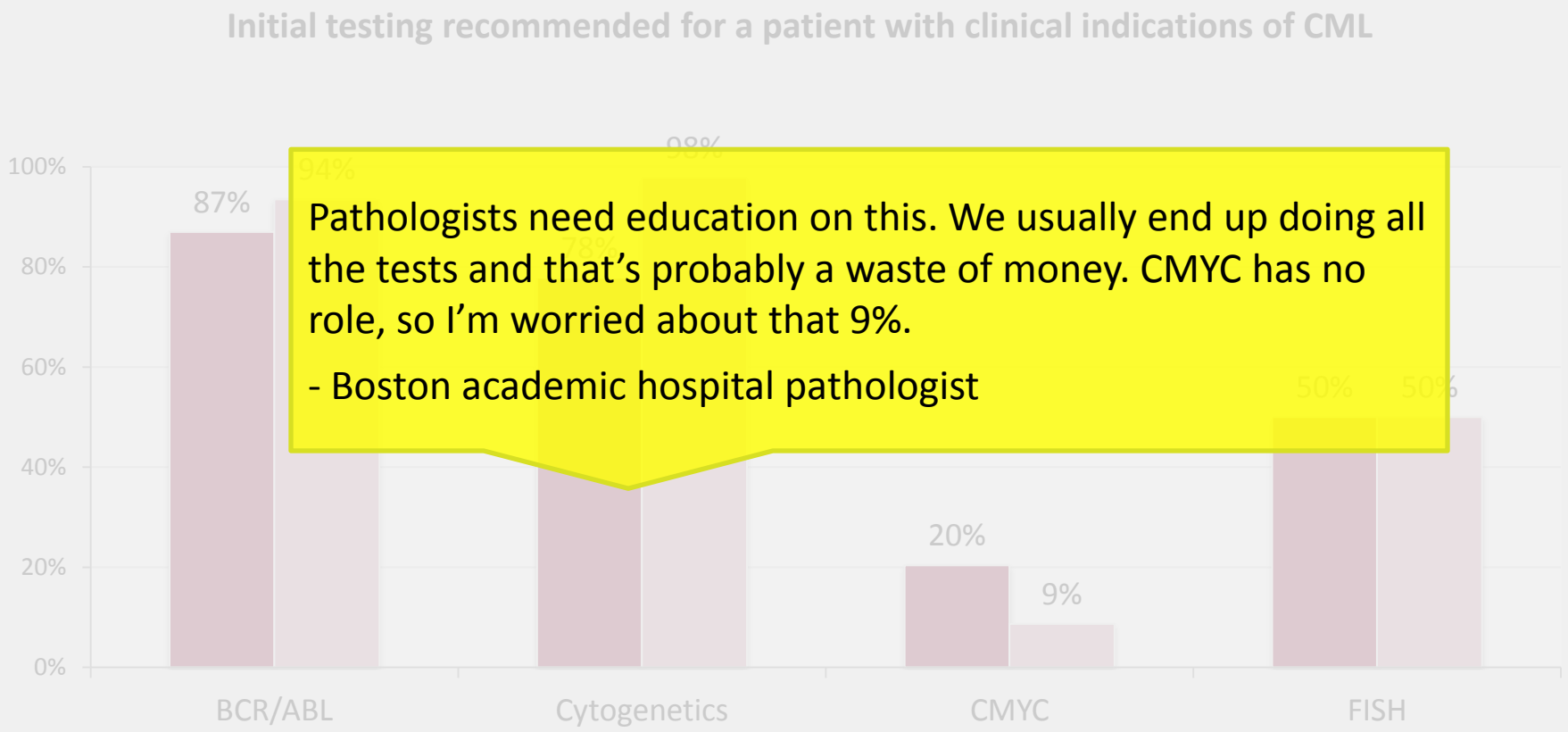
CML

Recommended Testing for Diagnosis



- Almost 80% of both groups would appropriately order BCR/ABL and cytogenetic tests for a patient with signs of CML, half included FISH although it would be redundant with BCR/ABL
- Notable portions of both groups also included CMYC which does not have a role in CML testing.

Recommended Testing for Diagnosis



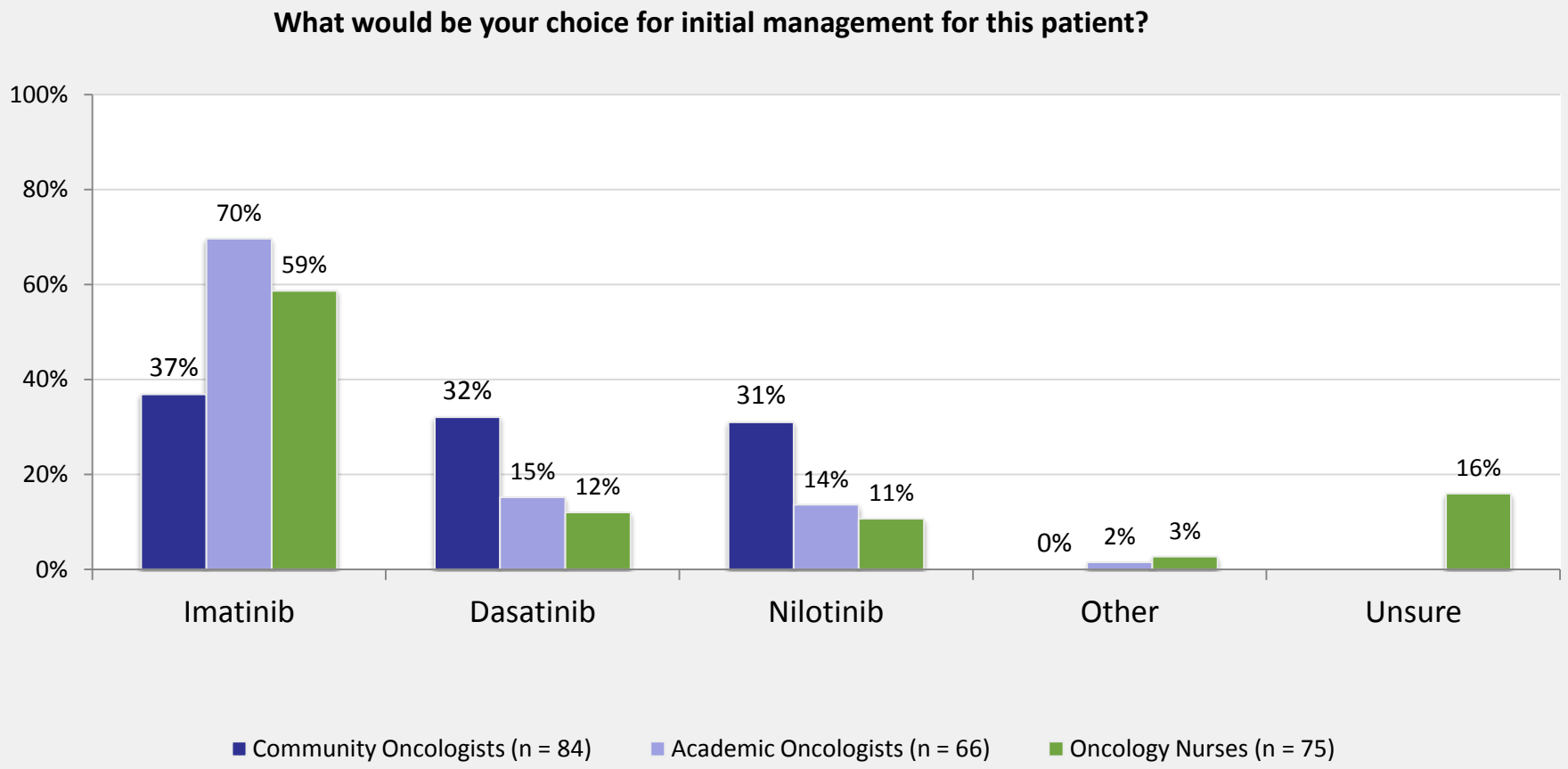
Pathologists need education on this. We usually end up doing all the tests and that's probably a waste of money. CMYC has no role, so I'm worried about that 9%.

- Boston academic hospital pathologist

- Almost 80% of both groups would appropriately order BCR/ABL and cytogenetic tests for a patient with signs of CML
- Notable portions of both groups also included CMYC which does not have a role in CML testing.

Initial Treatment of CML

- For initial therapy for a patient with CML, most academic oncologists and nurses would select imatinib, but community oncologists are much more divided among imatinib, dasatinib, and nilotinib.



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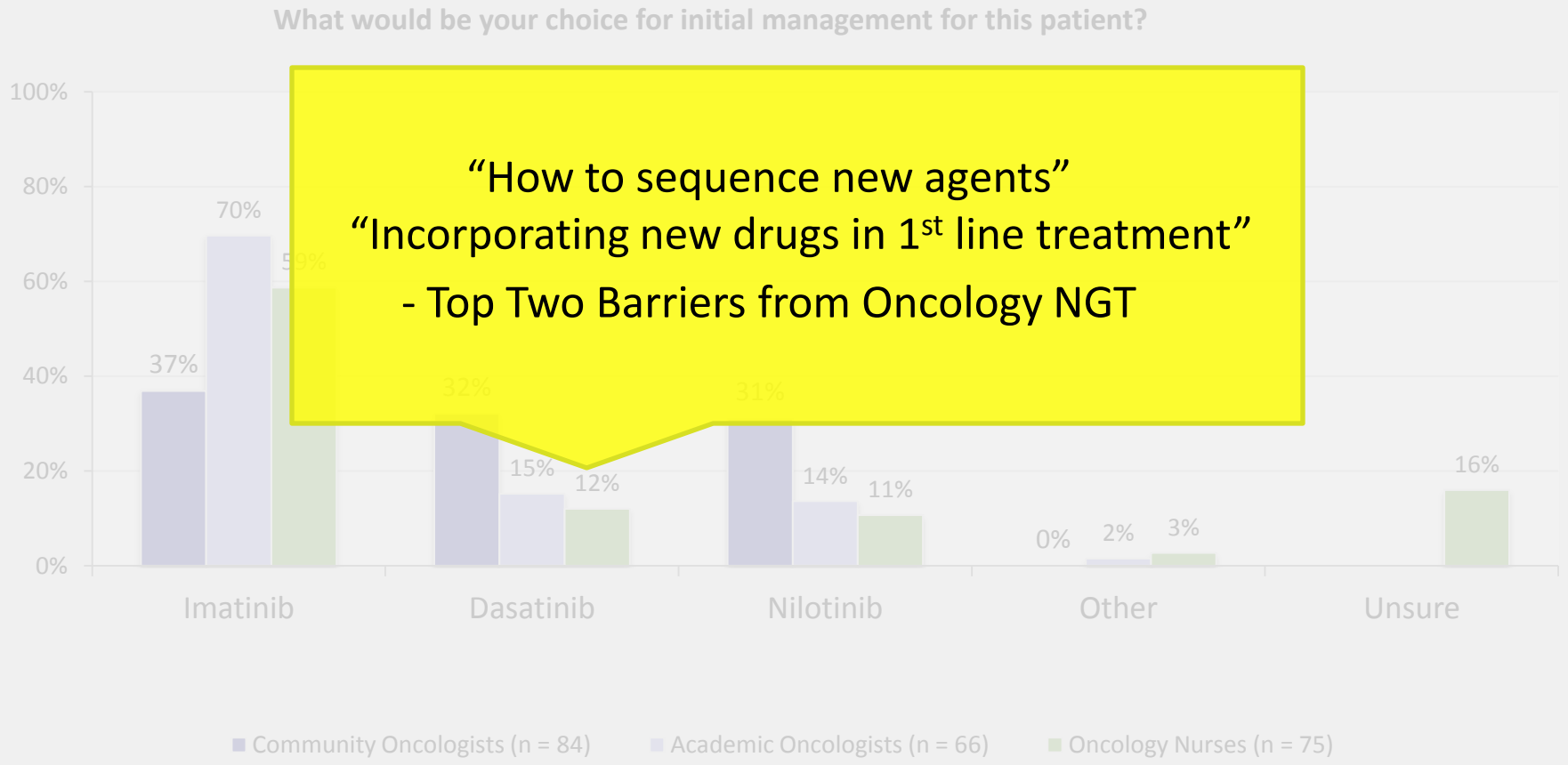
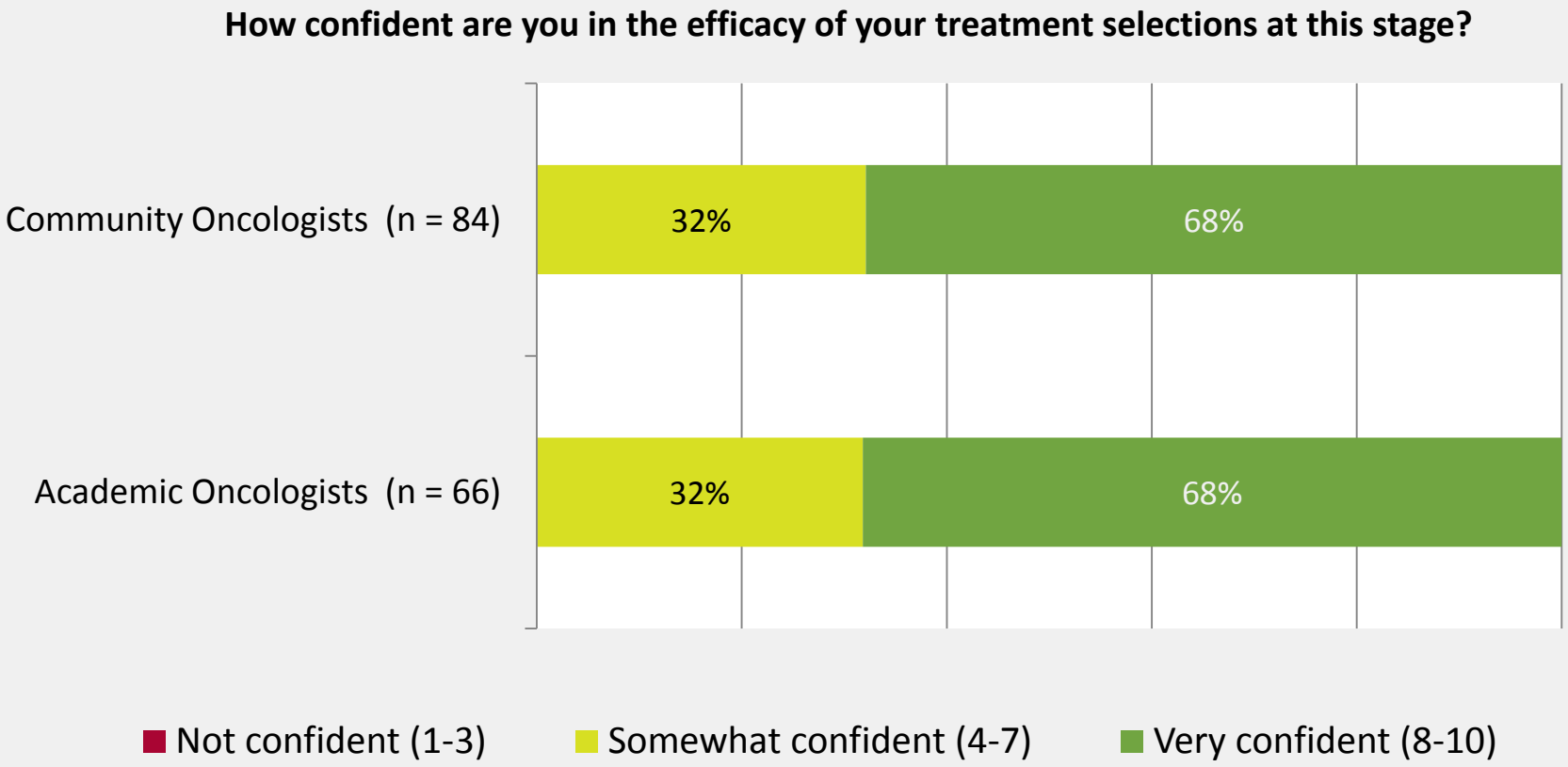


"How to sequence new agents"
"Incorporating new drugs in 1st line treatment"
- Top Two Barriers from Oncology NGT

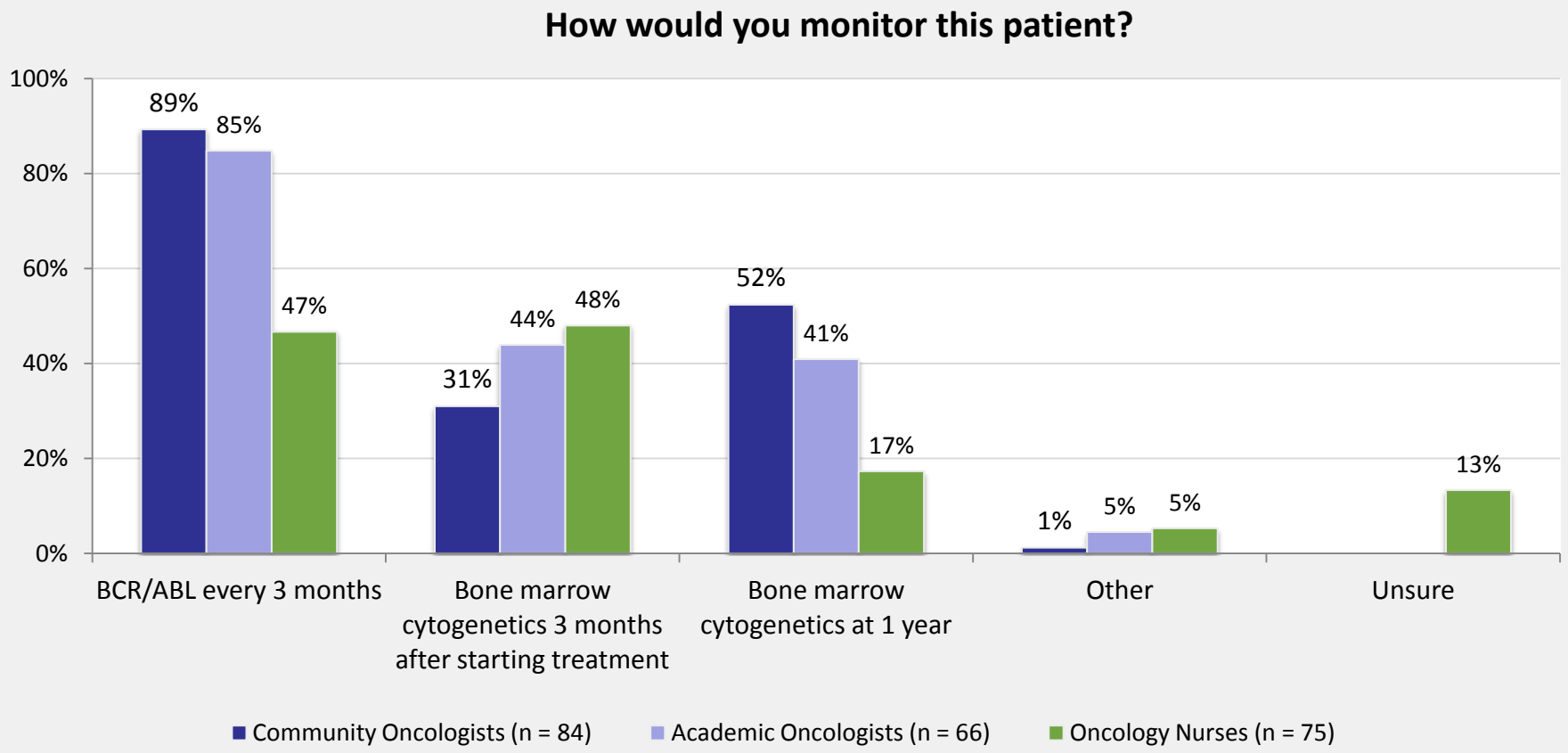
Confidence in Efficacy of CML Treatment

- Confidence in efficacy of CML therapy among academic oncologists is on par with community oncologists, reflecting a higher level of confidence compared to the efficacy of CLL or FL therapies.



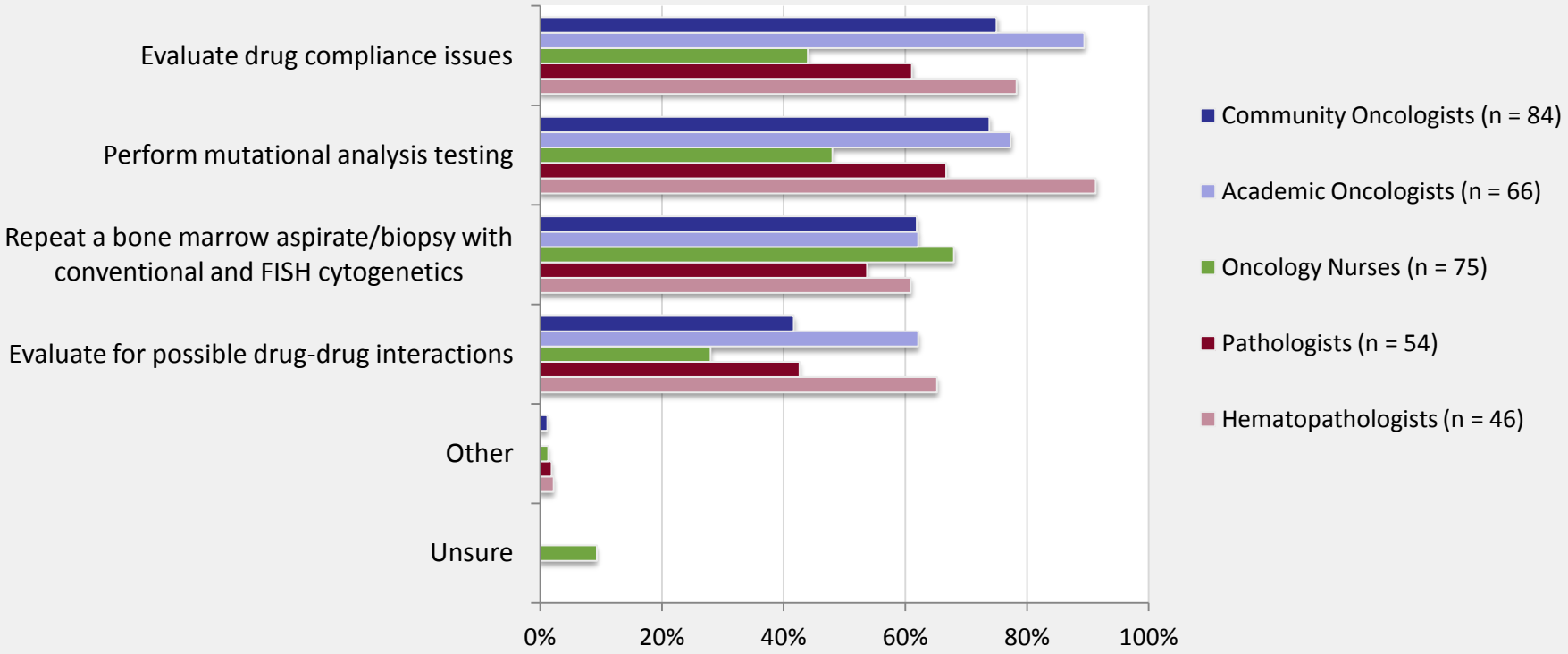
Monitoring a Patient with CML After Treatment

- To monitor a patient after initiating CML treatment, just over half of oncologists (55%) include bone marrow cytogenetics (at 3 months or 1 year into treatment) with BCR/ABL status of a patient with CML.



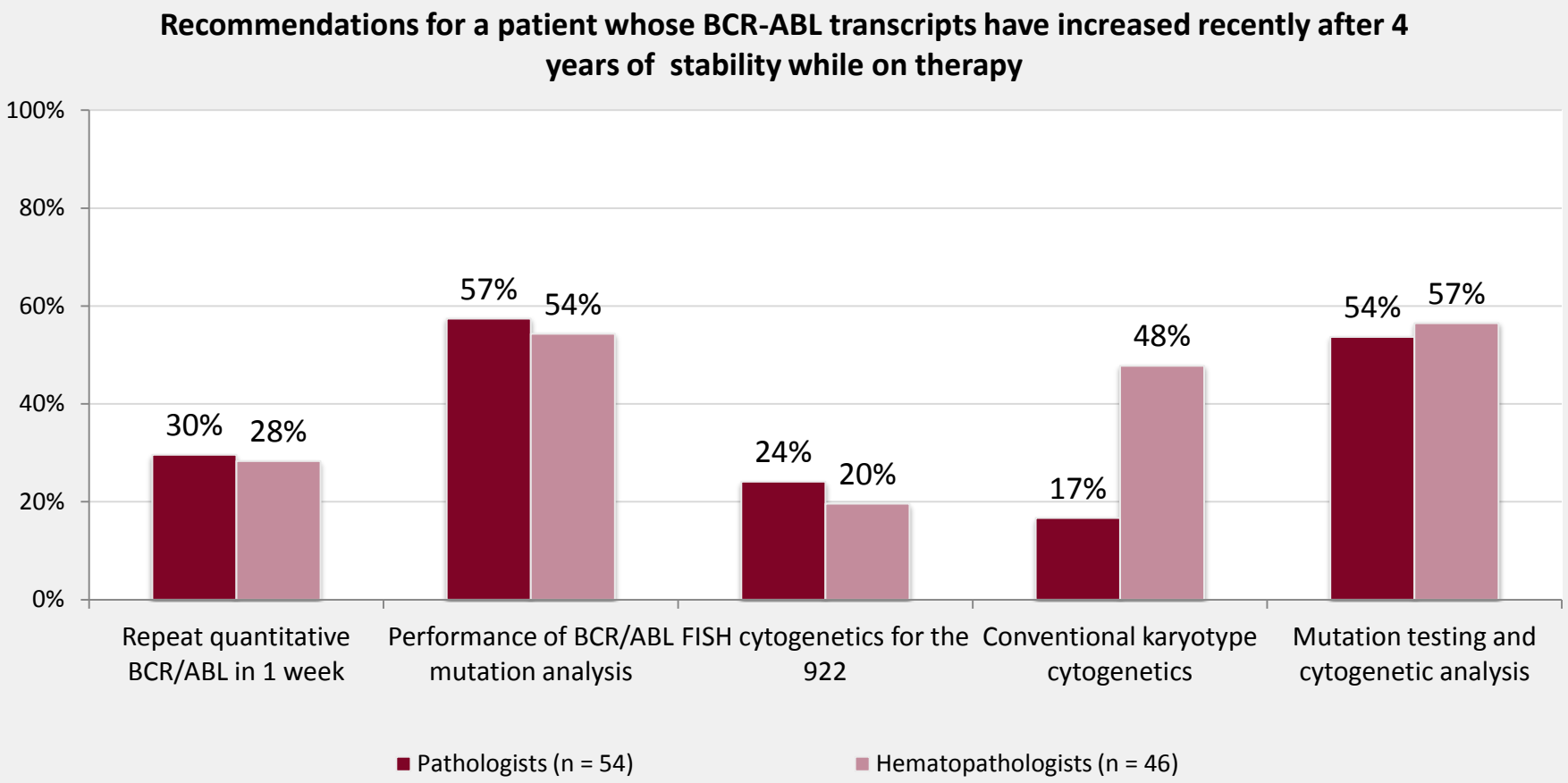
Continued Monitoring for a Patient with CML

Monitoring a patient whose BCR/ABL results signal progression after 4 years of stable disease while on therapy



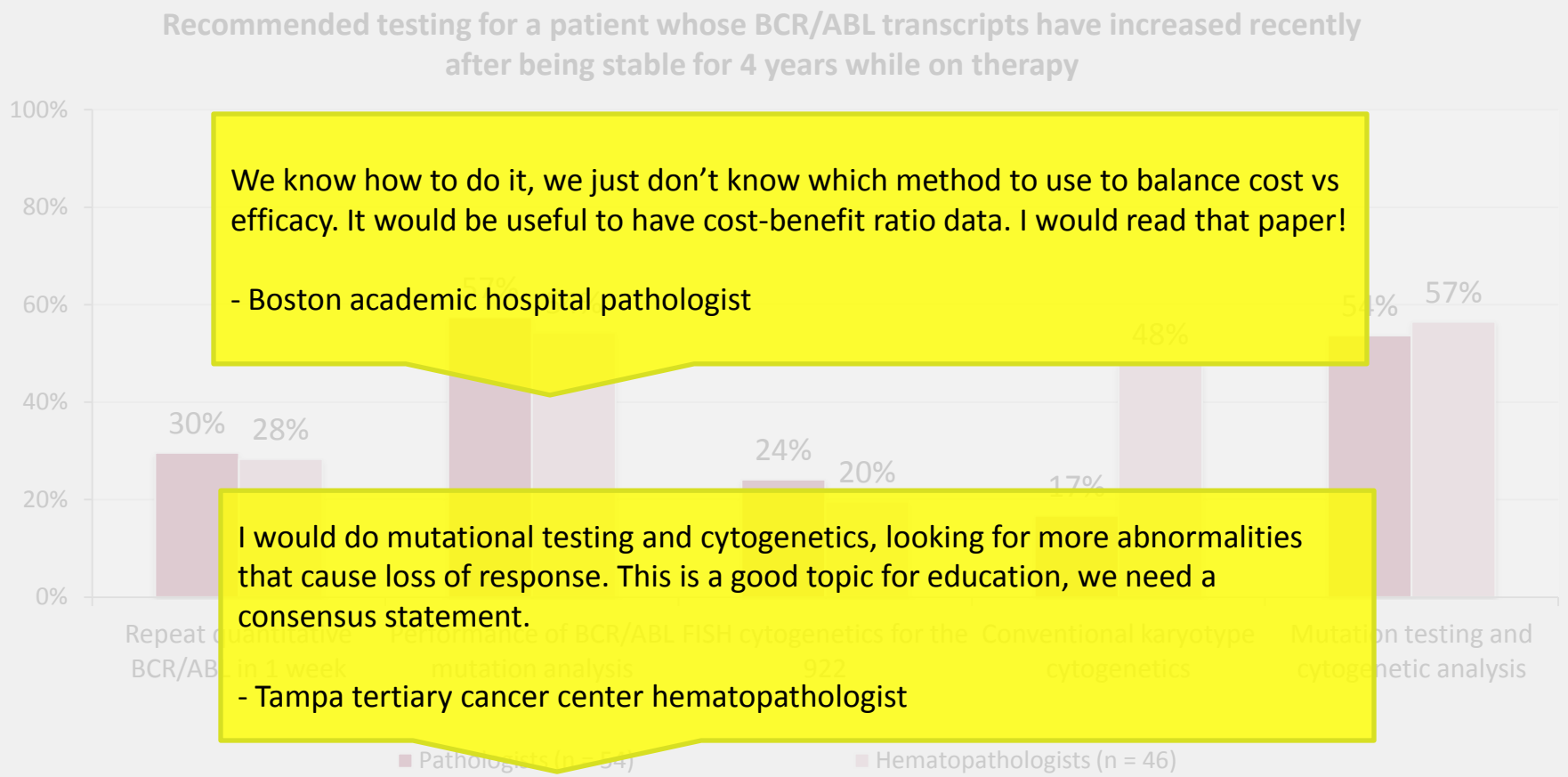
- For a patient whose BCR/ABL indicate progression after 4 years of stable disease on imatinib therapy, most oncologists and pathology physicians would appropriately evaluate compliance and perform mutational analysis; they were somewhat less likely to put the patient through a repeat bone marrow aspirate/biopsy.

Testing for a Patient with Increased BCR/ABL Transcripts



- There is little consensus among pathology physicians in what to do next for a patient whose BCR/ABL transcripts begin to increase after being stable during 4 years of therapy. An analysis of testing combinations found the most frequent choice was *mutational testing and cytogenetic analysis* (not in combination with other choices) selected by only 24% of hematopathologists and 17% of pathologists.

Testing for a Patient with Increased BCR/ABL Transcripts



We know how to do it, we just don't know which method to use to balance cost vs efficacy. It would be useful to have cost-benefit ratio data. I would read that paper!

- Boston academic hospital pathologist

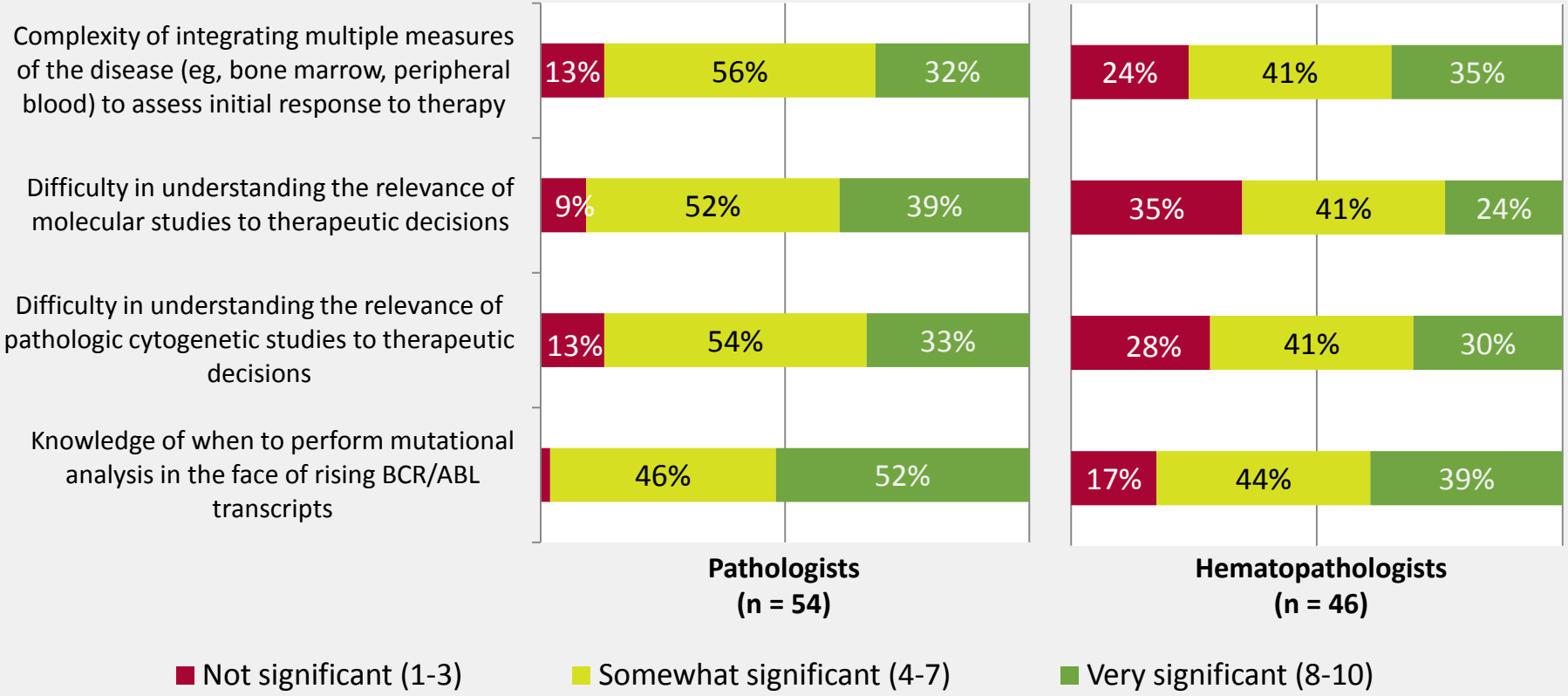
I would do mutational testing and cytogenetics, looking for more abnormalities that cause loss of response. This is a good topic for education, we need a consensus statement.

- Tampa tertiary cancer center hematopathologist

- There is little consensus among pathology physicians in what to do next for a patient whose BCR/ABL transcripts begin to increase after being stable during 4 years of therapy,

Barriers to Optimal Diagnosis of CML

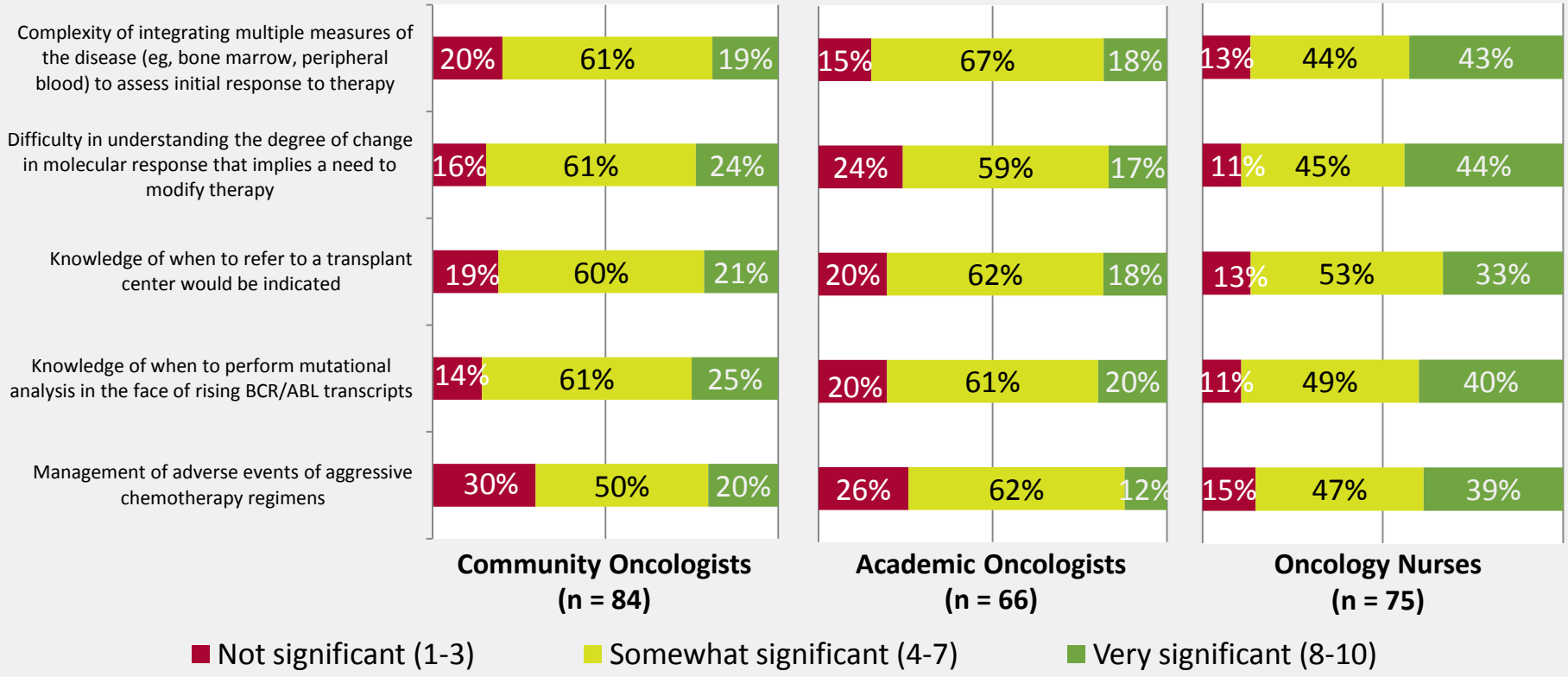
How significant are each of the following barriers to the optimal diagnosis of CML?



- Almost half of pathology physicians consider questions regarding when to perform mutational analysis in the face of rising BCR/ABL transcripts to be a barrier
- A third of both groups consider the complexities of CML testing (relevance of cytogenetics to treatment choice, integrating multiple measures) to be a barrier

Barriers to Optimal Management of CML

How significant are each of the following barriers to the optimal management of CML?



- Similar to perception of barriers in CLL and FL management, most oncologists do not perceive much significance to barriers related to CML management, reflecting a relative level of comfort in managing this type of patient.
- More oncology nurses perceive these barriers as significant, similarly to barriers to CLL and FL management.

Summary of Findings

CLL

Follicular Lymphoma

CML

- Academics have more consensus than community oncologists in selecting 1st-line targeted therapy:
  - 1st choice for academics: imatinib 70%
  - 1st choice for community: imatinib 37%
- Most community AND academic oncologists are very confident in efficacy of CML therapies
- To monitor after initiating therapy, almost all check BCR/ABL, but just over half also check bone marrow cytogenetics
- For a patient on therapy with signs of progression after years of stable disease, most would evaluate drug compliance and perform mutational analysis
- Pathology physicians may be making redundant choices in initial testing
- Pathology physicians lack clarity on testing in the face of increasing BCR/ABL transcripts

Review of Findings

CLL

- Possible overlooking of factors that can inform when to initiate therapy:
  - Development of hemolytic anemia
  - Doubling time < 6 months
- Nurses are much more likely to consider patient desire in deciding when to initiate therapy
- Very limited use of pathology consultation when deciding on prognostic tests
- Almost a quarter of general pathologists would not include FISH with 17p deletion in initial testing
- Almost all are making evidence-based 1st line treatment selections
  - Academics are much less confident in 1st line efficacy than community oncologists
- A third of community oncologists use maintenance in a setting of limited effectiveness (17p deletion)
- General concern regarding:
  - Infection risk
  - Selection of 1st line therapy
  - When to initiate therapy
  - Criteria for referral for ASCT

FL

- Almost all are making evidence-based 1st line selections:
  1. Bendamustine-rituximab (BR)
  2. R-CHOP
- 3 out of 4 put patients on rituximab maintenance after a CR from 1st line treatment
  - Academics are most likely (24%) to opt for no further treatment
- Most academics are not very confident in 1st line/maintenance FL therapies
- More concern regarding risk of infection than risk of PML or hypogammaglobulinemia for rituximab maintenance
  - Most academics concerned over possibility of reduced benefit of rituximab at 1st relapse
- Pathologists lack clarity in which IHC tests are diagnostic and which can differentiating subtypes

Review of Findings

CML

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Actionable Insights - Oncologists

- CLL
  - Review factors that can inform when to start therapy for CLL
- FL
  - Review toxicity profiles of approved treatment regimens
  - Explore evidence for rituximab maintenance, potential adverse events, and consequences of its use
- CML
  - Review evidence for the use of available therapies for CML, including cost effectiveness data
  - Discuss methods for monitoring patients with CML after the initiation of therapy
  - Review the evaluation of patients who progress after years of stable disease on first-line therapy

Actionable Insights – Pathology Physicians

- CLL
  - Review the selection and interpretation of testing to inform prognosis
  - Address strategies for communicating to oncologists on providing sufficient tissue specimens and accompanying clinical information
- FL
  - Clarify the role of specific tests (diagnostic vs. molecular subtyping)
  - Provide updates on biomarkers in development
- CML
  - Reinforce appropriate, cost effective initial testing
  - Provide information on cost/benefit analysis to improve test selection
  - Review evidence for testing for patients with rising BCR/ABL transcripts

Actionable Insights - Nurse

- CLL
  - Review factors that can inform when to start therapy for CLL
  - Provide information on which prognostic markers should be used in CLL and the implications of positive tests
  - Examine evidence for the regimens to manage CLL with 17p deletion, including ongoing management after first-line therapy and the use of ASCT
  - Inform on ways to effectively communicate therapeutic strategies with patients with CLL
  - Provide information on managing adverse events from chemotherapy used to manage CLL
- FL
  - Review toxicity profiles of approved treatment regimens
  - Explore evidence for rituximab maintenance and consequences of its use
  - Provide information on managing adverse events from chemotherapy used to manage FL
- CML
  - Review evidence for the use of available therapies for CML, including cost effectiveness data
  - Discuss monitoring patients with CML after the initiation of therapy, including testing and interpretation of test results
  - Review the evaluation of patients who progress after years of stable disease on first-line therapy
  - Provide information on managing adverse events from chemotherapy used to manage CML

Questions?

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Literature review: Follicular Lymphoma

- National LymphoCare Study[1]
  - Multicenter, longitudinal, observational study of newly diagnosed follicular lymphoma in the US
  - 2728 patients at 265 sites including 80% nonacademic sites
  - Initial treatment strategies used: 18% observed patients, 14% used rituximab monotherapy, 6% used a clinical trial, 6% used radiotherapy (XRT) alone, 3% used chemotherapy only, 52% used chemotherapy plus rituximab. Chemotherapy regimens combined with rituximab included CHOP (55%), CVP (23%), fludarabine (16%) and others (3%)
  - Choice to initiate therapy rather than observe associated with age, FLIPI score, stage, grade
- National LymphoCare Study[2]
  - Management of stage 1 follicular lymphoma
  - Diverse approaches among treatment centers despite guidelines that recommend radiotherapy
  - Among 471 patients prospectively enrolled, 206 (44%) patients had rigorous staging with bone marrow aspirate and CT/PET
- National Lymphocare Study[3]
  - Evaluated variations in treatment by racial groups of follicular lymphoma
  - Hispanics also tend to receive more rituximab + chemotherapy than Caucasians
  - Hispanics and African Americans initially treated with monoclonal antibody were less likely to received maintenance treatment

Literature review: CML

- Practice patterns survey of Americans and Europeans: treatment practices in some areas of CML management not in line with guidelines[1]
  - Performed in 2006, 956 hematologists and oncologists from US (76%) and Europe (24%); US physicians (60%) were community practitioners
  - Use of TKI is agreed upon as first line CML treatment
  - Confusion existed about optimal timing of treatment decisions
  - Monitoring for molecular response to TKI is variable, largely done at a single time point and with various techniques and laboratories
  - Knowledge about which molecular technique to perform for follow-up was variable
- Study surveyed 507 medical oncologists[2]
  - Use of imatinib as first line CML treatment dropped from 62% to 52% from 2005 to 2012
  - 40% of respondents: nilotinib or dasatinib can be considered first line treatment
- International retrospective medical record review of 1,063 patients with Philadelphia chromosome and/or BCR-ABL-positive chronic-phase CML: American patients had higher use of nilotinib[3]
- National Cancer Institute's Patterns of Care study [4]
  - Reviewed medical records and queried physicians about therapy for 423 patients with CML diagnosed in 2003, randomly selected from registries in the SEER database
  - Imatinib given to 76% of patients, use was inversely associated with age
  - After adjusting for age, imatinib use did not vary significantly by race/ethnicity, socioeconomic status, urban/rural residence, presence of co-morbid conditions, or insurance status
- Study of 29 community oncologists' monitoring of 297 patients on imatinib as first line-therapy[5]
  - By 18 months, 47% of patients had cytogenetic response assessment continuously
  - 39% had continuous molecular response assessment
  - For patients who had treatment failure by 18 months, only 14%-38% of patients were switched to a second-generation tyrosine kinase inhibitor

Literature review: Unpublished data

- Maintenance of Certification and Lifelong Learning Workshops conducted at American Society of Clinical Oncology (ASCO) Meetings for the American Board of Internal Medicine
  - Community oncologists given clinical scenarios and answer to questions with an audience response system
  - 2009 meeting knowledge gaps
    - Molecular targets of various tyrosine kinase inhibitors
    - Use of lenalidomide for relapsed multiple myeloma
    - Role of hydroxyurea for essential thrombocythemia
  - 2010 session
    - 23% of physicians felt that maintenance rituximab was indicated for diffuse large B-cell lymphoma patients in complete remission after R-CHOP
    - 62% of physicians knew the appropriate management of a patient with acute lymphoblastic leukemia
    - 14% correctly answered a question on prognosis for patients with acute myelogenous leukemia.
- Interactive board review sponsored by ASCO in March 2012
  - 30% of physicians correctly answered a question about prognosis of patients with monoclonal gammopathy of undetermined significance
  - 45% correctly answered a question on consolidation chemotherapy for a core binding factor acute myelogenous leukemia
  - 44% gave the correct answer on management of low-risk myelodysplasia