

MITRE / FLUX NOTES **COMPASS DRAFT CONCEPTS: MISSING & LIMITED DATA**

DANIEL REEVES, JUHAN SONIN, 5.Mar.2019



I

CRITERIA WITH MISSING DATA IN PATIENT RECORD



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Dr. Bran24 Michel09A



Debra24 Hernandez98Aj

Date of birth
5 Apr 1967 (51)Admin. sex
FemaleLocation
Boston, MAROID
12345432312Condition
invasive ductal carcinoma of breast

Clinician



Collaborative



Overview

Treatment Options invasive ductal carcinoma of breast

Outcomes and criteria for 156,765 patients with Invasive ductal carcinoma of breast were collected by CancerLinQ [...more](#)

Visit Type initial consultation ▾

select a preconfigured set of treatment types and outcome metrics

▼ Similar patients 430 patients

criteria: all except grade

[select all](#) [select none](#)

demographic

- age: 50-59
- age at diagnosis: 41-61
- race: white
- sex: female

pathology

- T: T1c
- N: N0
- M: M0
- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive

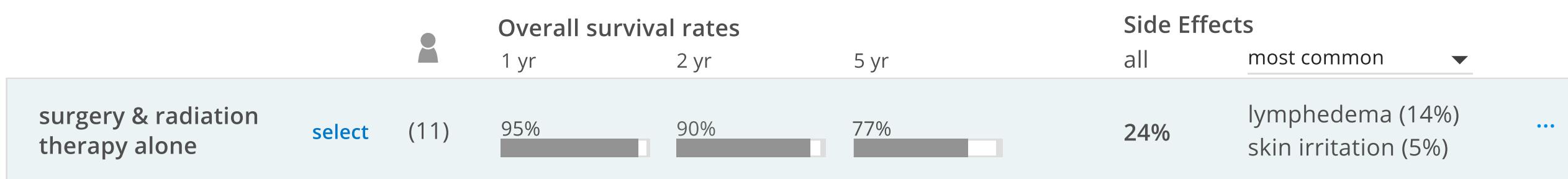
genomics

- BRCA: negative

MVP proposal

- removed category level interaction and collapsing. It was of little value and added complexity.
- fields missing from patients record are not available as criteria

> Outcomes overall survival rate and common side effects



additional treatments select

hormonal therapy & chemotherapy

(70)



51%

nausea & vomit... (25%)
hair loss (21%)

...



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- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive

genomics

- BRCA: negative
- ODXR Score: (missing)

performance

- Karnofsky: (missing)
- ECOG: (missing)

FUTURE proposal

- available elements are drawn from a list associated with the condition.

- This patient record does not contain values for the last three elements. They are marked as missing.

> Outcomes overall survival rate and common side effects

Overall survival rates



1 yr 2 yr 5 yr

Side Effects

all

most common ▾

surgery & radiation therapy alone

[select](#) (11)

95%

90%

77%

24%

lymphedema (14%)
skin irritation (5%)

...

additional treatments [select](#)

hormonal therapy & chemotherapy

(70)

97%

95%

90%

51%

nausea & vomit... (25%)
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...



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▼ Similar patients 430 patients

criteria: *all except grade*

[select all](#) [select none](#)

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- age: 50-59
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- sex: female

pathology

- T: T1c
- N: N0
- M: M0
- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive

genomics

- BRCA: negative
- ODXR Score: (missing)

performance

- Karnofsky: (missing)

FUTURE proposal

- The user must select a value (or range) to activate one of the “missing” criteria

> Outcomes overall survival rate and common side effects



Overall survival rates

1 yr 2 yr 5 yr

surgery & radiation therapy alone

[select](#) (11)

95%

90%

77%

40 80



Confirm

skin irritation (5%)

additional treatments [select](#)

hormonal therapy & chemotherapy

(70)

97% ▲ 2%

95% ▲ 5%

90% ▲ 13%

51%

nausea & vomit... (25%)
hair loss (21%)

...



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select a preconfigured set of treatment types and outcome metrics

▼ Similar patients 300 patients

criteria: *all except grade*

[select all](#) [select none](#)

demographic

- age: 50-59
- age at diagnosis: 41-61
- race: white
- sex: female

pathology

- T: T1c
- N: N0
- M: M0
- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive

genomics

- BRCA: negative
- ODXR Score: (missing)

performance

- Karnofsky: 40-80 (missing)
- ECOG: (missing)

FUTURE proposal

- after the selection is made, the filter is applied. The element still marks “missing” to indicate that the value is missing from the record and the user entered it by hand.
- is a different text, such as “manual input” more helpful?

> Outcomes overall survival rate and common side effects

	Overall survival rates				Side Effects	all	most common
		1 yr	2 yr	5 yr			
surgery & radiation therapy alone	select (11)	95%	90%	77%	24%	lymphedema (14%) skin irritation (5%)	...
additional treatments	select						

additional treatments select

hormonal therapy & chemotherapy

(70)



51%

nausea & vomit... (25%)
hair loss (21%)

...

2 TOO FEW PATIENTS IN MATCHED COHORT



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Outcomes and criteria for 156,765 patients with Invasive ductal carcinoma of breast were collected by CancerLinQ [...more](#)

Visit Type initial consultation

select a preconfigured set of treatment types and outcome metrics

Similar patients 23 patients

criteria: *all*

[select all](#) [select none](#)

demographic

- age: 50-59
- age at diagnosis: 41-61
- race: white
- sex: female

pathology

- T: T1c
- N: N0
- M: M0
- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive

genomics

- BRCA: negative
- ODXR Score: missing

performance

- Karnofsky: missing
- ECOG: missing

MVP proposal

⚠ Very few patients! Try relaxing criteria

- The user is alerted that there are **too few patients in the cohort**.
- A statistically driven cutoff would be needed. Perhaps this appears if there are **NO treatment options with a statistically adequate set**.

Outcomes overall survival rate and common side effects



Overall survival rates

1 yr 2 yr 5 yr

Side Effects

all most common

surgery & radiation therapy alone

[select](#)

(5)

95%

90%

77%

24%

lymphedema (14%)
skin irritation (5%)

...

additional treatments [select](#)

hormonal therapy & chemotherapy

(7)

97% ▲ 2%

95% ▲ 5%

90% ▲ 13%

51%

nausea & vomit... (25%)
hair loss (21%)

...



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Visit Type initial consultation ▾

select a preconfigured set of treatment types and outcome metrics

▼ Similar patients 82 patients

criteria: all

[select all](#) [select none](#)

demographic

- age: 50-59
- age at diagnosis: 41-61
- race: white
- sex: female

pathology

- T: T1c
- N: N0
- M: M0
- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive

genomics

- BRCA: negative
- ODXR Score: missing

performance

- Karnofsky: missing
- ECOG: missing

MVP proposal

- The user deselects a criterion, the patient pool increases, and the warning disappears.

> Outcomes overall survival rate and common side effects

	Overall survival rates	Side Effects				
			1 yr	2 yr	5 yr	all
surgery & radiation therapy alone	select (5)	24%	lymphedema (14%) skin irritation (5%)	...		
additional treatments	select	51%	nausea & vomit... (25%) hair loss (21%)	...		

additional treatments select

hormonal therapy & chemotherapy

(7)



51%

nausea & vomit... (25%)
hair loss (21%)

[...](#)



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Treatment Options invasive ductal carcinoma of breast

Outcomes and criteria for 156,765 patients with Invasive ductal carcinoma of breast were collected by CancerLinQ [...more](#)

Visit Type initial consultation ▾

select a preconfigured set of treatment types and outcome metrics

▼ Similar patients 23 patients

criteria: [all](#)

[select all](#) [select none](#)

demographic

- age: 50-59
- age at diagnosis: 41-61
- race: white
- sex: female

pathology

- T: T1c
- N: N0
- M: M0
- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive !

genomics

- BRCA: negative
- ODXR Score: missing

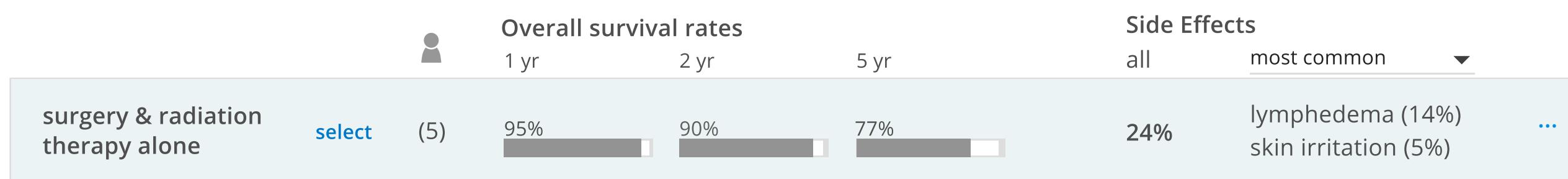
performance

- Karnofsky: missing
- ECOG: missing

Future proposal

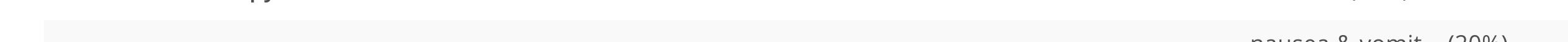
- Again, the user is alerted there are too few patients in the pool.
- Here, we are alerted that many records have been discarded due to missing HER2 data.

> Outcomes overall survival rate and common side effects



additional treatments [select](#)

hormonal therapy & chemotherapy





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Outcomes and criteria for 156,765 patients with Invasive ductal carcinoma of breast were collected by CancerLinQ [...more](#)

Visit Type initial consultation ▾

select a preconfigured set of treatment types and outcome metrics

Similar patients 23 patients

criteria: [all](#)

[select all](#) [select none](#)

demographic

- age: 50-59
- age at diagnosis: 41-61
- race: white
- sex: female

pathology

- T: T1c
- N: N0
- M: M0
- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive !

genomics

- BRCA: negative
- ODXR Score: missing

performance

! Very few patients! Try relaxing criteria

! Many records discarded due to missing data ([manage](#))

Future proposal

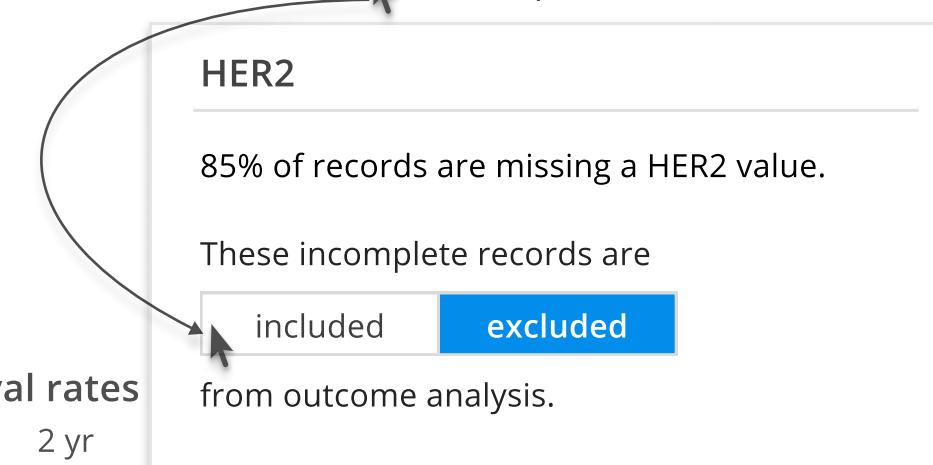
- The user can choose to include those records with missing data, while still EXCLUDING those records with a mismatch.

Outcomes overall survival rate and common side effects



Overall survival rates

1 yr 2 yr



most common ▾

surgery & radiation therapy alone

[select](#) (5)

95%

90%

77%

24%

lymphedema (14%)
skin irritation (5%)

...

additional treatments [select](#)

hormonal therapy & chemotherapy

(7)

97% ▲ 2%

95% ▲ 5%

90% ▲ 13%

51%

nausea & vomit... (25%)
hair loss (21%)

...



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Visit Type initial consultation ▾

select a preconfigured set of treatment types and outcome metrics

▼ **Similar patients** 96 patients

criteria: *all*

[select all](#) [select none](#)

demographic

- age: 50-59
- age at diagnosis: 41-61
- race: white
- sex: female

pathology

- T: T1c
- N: N0
- M: M0
- stage: IA
- grade: 2

biomarkers

- ER: negative
- PR: positive
- HER2: positive or unknown

❗ Some records included with missing data ([manage](#))

Filtering incomplete records

Records missing values for “checkmarked” criteria are **included** or **excluded** when computing outcome analysis.

age	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
age at diagnosis	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
race	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
sex	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
T	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
N	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
M	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
stage	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
grade	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
ER	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
PR	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude
HER2	<input checked="" type="checkbox"/>	include	<input type="checkbox"/>	exclude
BRCA	<input type="checkbox"/>	include	<input checked="" type="checkbox"/>	exclude

> **Outcomes** overall survival rate and common side effects



Overall survival rates

1 yr 2 yr 5 yr

surgery & radiation therapy alone

[select](#) (10)

95%

90%

77%

additional treatments [select](#)

hormonal therapy & chemotherapy

(15)

97% ▲ 2%

95% ▲ 5%

90% ▲ 13%

51%

nausea & vomit... (25%)
hair loss (21%)

...

nausea & vomit... (20%)

...

Future proposal

- The user can manage the rules all at once
- If any are set to “include”, it is indicated in the top row, as well as at the criteria itself.

3 TOO FEW PATIENTS FOR TREATMENT OPTION



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Visit Type initial consultation ▾

select a preconfigured set of treatment types and outcome metrics

MVP proposal

> **Similar patients** 292 patients

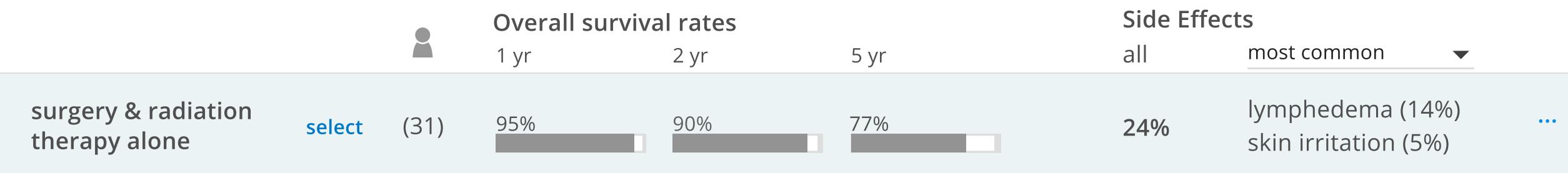
criteria: *all*

- treatment option sets with too few patients are listed in the last line.

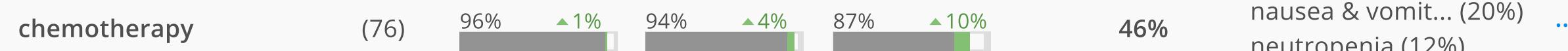
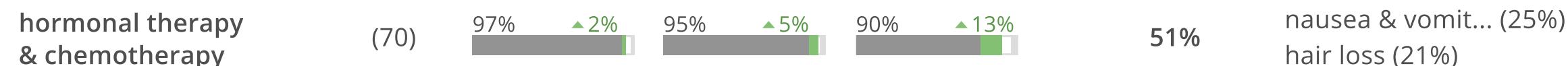
> **Outcomes** overall survival rate and common side effects

- again, a statistics driven cutoff is needed.

Overall survival rates



additional treatments select



hormonal therapy (6) Few patients in this cohort received these treatments, and the statistics are insufficient. [show anyway](#)



survived with surgery and radiation therapy alone
survivors due to additional treatment
cancer related deaths
non-cancer related deaths

Treatment Options



Treatment Options invasive ductal carcinoma of breast

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Visit Type [initial consultation](#) ▾

select a preconfigured set of treatment types and outcome metrics

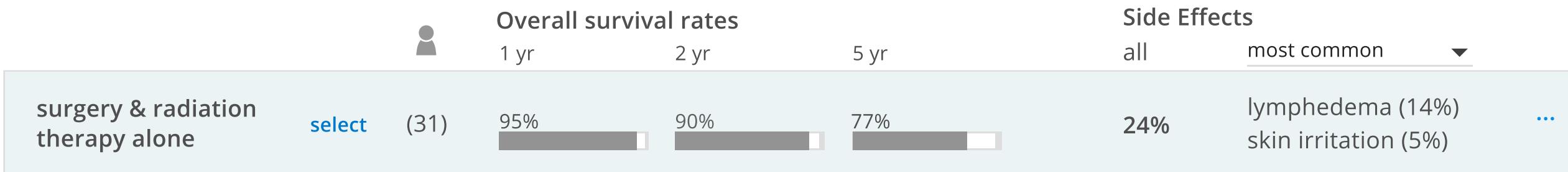
> Similar patients 292 patients

criteria: [all](#)

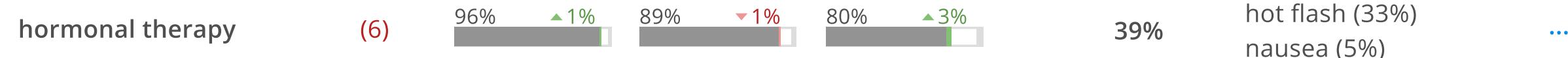
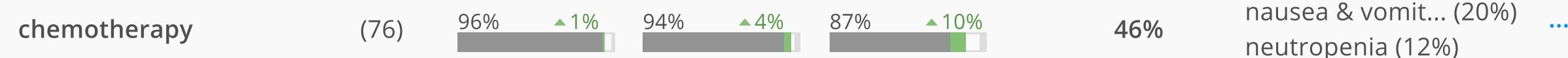
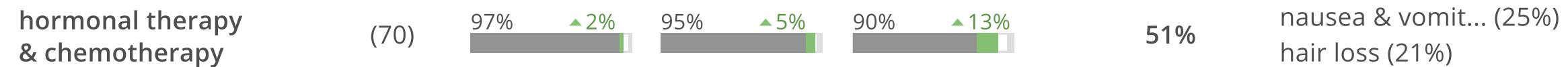
MVP proposal

> Outcomes overall survival rate and common side effects

- the user can choose to show the treatment anyway. And an option to re-hide is displayed.



additional treatments [select](#)



[hide treatments with fewer than 10 patients](#)



survived with surgery and radiation therapy alone
survivors due to additional treatment
cancer related deaths
non-cancer related deaths

Overview

Active Conditions

Procedures

Medications

Disease Status

Treatment Options



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select a preconfigured set of treatment types and outcome metrics

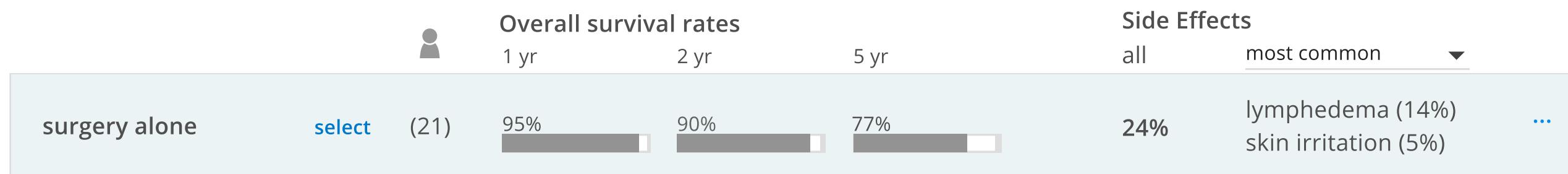
> **Similar patients** 292 patients

criteria: all

MVP proposal

> **Outcomes** overall survival rate and common side effects

- if there are multiple treatment sets, they are all listed on one line.



additional treatments select

Treatment Options

hormonal, radiation, & chemotherapies (70) 97% 95% 90% 51% nausea & vomit... (25%)
hair loss (21%) ...

radiation therapy & chemotherapy (76) 96% 94% 87% 46% nausea & vomit... (20%)
neutropenia (12%) ...

radiation therapy (31) 96% 94% 87% 46% nausea & vomit... (20%)
neutropenia (12%) ...

hormonal therapy; chemotherapy;
radiation therapy + hormonal therapy Few patients in this cohort received these treatments, and the statistics are insufficient. [show anyway](#)



survived with surgery and radiation therapy alone
survivors due to additional treatment