

## METHODS SECTION

A systematic search was performed in the databases: PubMed, Embase.com, Clarivate Analytics/Web of Science Core Collection and the Wiley/Cochrane Library. The timeframe within the databases was from inception to 19<sup>th</sup> January 2022 and conducted by GBL and IW. The search included keywords and free text terms for (synonyms of) 'breast neoplasm' combined with (synonyms of) 'erythroblastic oncogene B' combined with (synonyms of) 'brain metastasis'. Reviews, animal studies, comments, letters, editorials, qualitative studies, case reports and case series were excluded from the search. A full overview of the search terms per database can be found in the supplementary information (see appendix 1). No limitations on date or language were applied in the search.

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## Supplementary File S1

Table S1: Search strategy in PubMed

| Search | Query   | Results |
|--------|---|---------|
| #9     | #8 NOT ("Case Reports"[Publication Type] OR "case report*"[tiab] OR "case stud*"[tiab] OR "case histor*"[tiab] OR "case serie*"[tiab])  | 556     |
| #8     | #7 NOT ("Qualitative Research"[Mesh] OR "Focus Groups"[Mesh] OR "Interview"[Publication Type] OR "Interviews as Topic"[Mesh] OR "Narration"[Mesh] OR "Personal Narratives as Topic"[Mesh] OR "Observational Studies as Topic"[Mesh] OR "Observational Study"[Publication Type] OR "Tape Recording"[Mesh] OR "Grounded Theory"[Mesh] OR "thematic analys*"[tiab] OR "content analys*"[tiab] OR "focus group*"[tiab] OR "ethnograph*"[tiab] OR "ethnograf*"[tiab] OR "etnograf*"[tiab] OR "field stud*"[tiab] OR "phenomenolog*"[tiab] OR "narration*"[tiab] OR "narrative"[tiab] OR "case stud*"[tiab] OR "qualitative stud*"[tiab] OR "qualitative analys*"[tiab] OR "qualitative research*"[tiab] OR "qualitative method*"[tiab] OR "multimethodolog*"[tiab] OR "mixed method*"[tiab] OR "observation*"[tiab] OR "grounded theor*"[tiab] OR "audio recording*"[tiab] OR "tape recording*"[tiab] OR "audiotape*"[tiab] OR (("semi-structured"[tiab] OR "semistructured"[tiab] OR "unstructured"[tiab] OR "informal"[tiab] OR "in-depth"[tiab] OR "indepth"[tiab] OR "face-to-face"[tiab] OR "structured"[tiab] OR "guide*"[tiab]) AND ("interview*"[tiab] OR "discussion*"[tiab] OR "questionnaire*"[tiab]))) | 629     |
| #7     | #6 NOT ("Comment" [Publication Type] OR "Letter" [Publication Type] OR "Editorial" [Publication Type])  | 650     |
| #6     | #5 NOT ("Animals"[Mesh] NOT "Humans"[Mesh])   | 683     |
| #5     | #4 NOT ("systematic review"[tiab] OR "systematic literature review*"[tiab] OR "review*"[tiab] OR "Review"[Publication Type] OR "Meta-Analysis as Topic"[Mesh] OR "meta-analysis"[tiab] OR "Meta-Analysis"[Publication Type])  | 698     |
| #4     | #1 AND #2 AND #3  | 976     |

| Search | Query  | Results |
|--------|--|---------|
| #3     | "central nervous system metasta*" [tiab] OR "CNS metasta*" [tiab] OR "brain metasta*" [tiab] OR "metastasis to the brain*" [tiab] OR "metastasized to the brain" [tiab] OR "metastasised to the brain" [tiab] OR "metastasis to the CNS*" [tiab] OR "metastasized to the CNS" [tiab] OR "metastasised to the CNS" [tiab] OR "metastasis to the central nervous system*" [tiab] OR "metastasized to the central nervous system*" [tiab] OR "metastasised to the central nervous system*" [tiab] | 16,228  |
| #2     | "Genes, erbB-2" [Mesh] OR "ERBB2 protein, human" [Supplementary Concept] OR "erythroblastic oncogene B" [tiab] OR "erbB2*" [tiab] OR "erbB 2*" [tiab] OR "ErbB2" [tiab] OR "ErbB 2" [tiab] OR "neugene*" [tiab] OR "neu gene*" [tiab] OR "proto-oncogene Neu*" [tiab] OR "human epidermal growth factor receptor 2*" [tiab] OR "HER2*" [tiab] OR "HER 2*" [tiab] OR "HER2/neu" [tiab] OR "CD340" [tiab] OR "CD 340" [tiab]   | 50,345  |
| #1     | "Breast Neoplasms" [Mesh] OR (("breast*" [tiab] OR "mamma*" [tiab]) AND ("cancer*" [tiab] OR "carcinom*" [tiab] OR "malignan*" [tiab] OR "metasta*" [tiab] OR "neoplas*" [tiab] OR "tumor*" [tiab] OR "tumour*" [tiab]))   | 504,112 |

# = number of search step, used in Wiley/Cochrane Library, \*is added standard in open text- search terms in Wiley/Cochrane Library to broaden the search.

Table S2: Search strategy in Embase.com

| Search | Query   | Results |
|--------|---|---------|
| #9     | #8 NOT ('case report'/exp OR ("case report*" OR "case stud*" OR "case histor*" OR "case serie*"):ti,ab,kw)  | 1,092   |
| #8     | #7 NOT ('qualitative research'/exp OR 'interview'/exp OR 'narrative'/exp OR 'observational study'/exp OR 'recording'/exp OR 'grounded theory'/exp OR ('thematic analys*' OR 'content analys*' OR 'focus group*' OR 'ethnograph*' OR 'ethnograf*' OR 'etnograf*' OR 'field stud*' OR 'phenomenolog*' OR 'narration*' OR 'narrative' 'case stud*' OR 'qualitative stud*' OR 'qualitative analys*' OR 'qualitative research*' OR 'qualitative method*' OR 'multimethodolog*' OR 'mixed method*' OR 'observation*' OR 'grounded theor*' OR 'audio recording*' OR 'tape recording*' OR 'audiotape*'):ti,ab,kw OR (('semi-structured' OR 'semistructured' OR 'unstructured' OR 'informal' OR 'in-depth' OR 'indepth' OR 'face-to-face' OR 'structured' OR 'guide*'):ti,ab,kw AND ('interview*' OR 'discussion*' OR 'questionnaire*'):ti,ab,kw)) | 1,248   |
| #7     | #6 NOT ('conference abstract'/it OR 'conference review'/it OR 'editorial'/it OR 'erratum'/it OR 'letter'/it OR 'note'/it OR 'short survey'/it))   | 1,304   |
| #6     | #5 NOT ([animals]/lim NOT [humans]/lim)   | 2,493   |
| #5     | #4 NOT ('systematic review'/exp OR 'meta analysis'/exp OR ('systematic literature review' OR 'systematic review*' OR 'meta-analys*' OR 'review*'):ab,ti,kw)   | 2,605   |
| #4     | #1 AND #2 AND #3  | 3,352   |
| #3     | 'central nervous system metastasis'/exp OR ('central nervous system metasta*' OR 'CNS metasta*' OR 'brain metasta*' OR 'metastasis to the brain*' OR 'metastasized to the brain' OR 'metastasised to the brain' OR 'metastasis to the CNS*' OR 'metastasized to the CNS' OR 'metastasised to the CNS' OR 'metastasis to the central nervous system*' OR 'metastasized to the central nervous system*' OR 'metastasised to the central nervous system*'):ti,ab,kw  | 50,534  |

| Search    | Query  | Results        |
|-----------|--|----------------|
| <b>#2</b> | 'oncogene neu'/exp OR 'epidermal growth factor receptor 2'/exp OR 'human epidermal growth factor receptor 2 positive breast cancer'/exp OR ('erythroblastic oncogene B' OR 'erbB2*' OR 'erbB 2*' OR 'ErbB2' OR 'ErbB 2' OR 'neugene*' OR 'neu gene*' OR 'proto-oncogene Neu*' OR 'human epidermal growth factor receptor 2*' OR 'HER2*' OR 'HER 2*' OR 'HER2/neu' OR 'CD340' OR 'CD 340'):ti,ab,kw | <b>108,102</b> |
| <b>#1</b> | 'breast tumor'/de OR 'breast cancer'/exp OR 'experimental mammary neoplasm'/exp OR (('breast*' OR 'mamma*'):ti,ab,kw AND ('cancer*' OR 'carcinom*' OR 'malignan*' OR 'metasta*' OR 'neoplas*' OR 'tumor*' OR 'tumour*'):ti,ab,kw)  | <b>760,299</b> |

# = number of search step, used in Wiley/Cochrane Library, \*is added standard in open text- search terms in Wiley/Cochrane Library to broaden the search.

Table S3: Search strategy in Clarivate Analytics/Web of Science Core Collection

| Search | Query  | Results |
|--------|--|---------|
| #7     | #6 NOT TS=("case report*" OR "case stud*" OR "case histor*" OR "case serie*")  | 1,031   |
| #6     | #5 NOT TS=("thematic analys*" OR "content analys*" OR "focus group*" OR "ethnograph*" OR "ethnograf*" OR "etnograf*" OR "field stud*" OR "phenomenolog*" OR "narration*" OR "narrative" "case stud*" OR "qualitative stud*" OR "qualitative analys*" OR "qualitative research*" OR "qualitative method*" OR "multimethodolog*" OR "mixed method*" OR "observation*" OR "grounded theor*" OR "audio recording*" OR "tape recording*" OR "audiotape*" OR (("semi-structured" OR "semistructured" OR "unstructured" OR "informal" OR "in-depth" OR "indepth" OR "face-to-face" OR "structured" OR "guide*") AND ("interview*" OR "discussion*" OR "questionnaire*"))) | 1,063   |
| #5     | #4 NOT TS=("systematic review" OR "systematic literature review*" OR "review*" OR "meta-analysis")   | 1,090   |
| #4     | #1 AND #2 AND #3   | 1,379   |
| #3     | TS=("central nervous system metasta*" OR "CNS metasta*" OR "brain metasta*" OR "metastasis to the brain*" OR "metastasized to the brain" OR "metastasised to the brain" OR "metastasis to the CNS*" OR "metastasized to the CNS" OR "metastasised to the CNS" OR "metastasis to the central nervous system*" OR "metastasized to the central nervous system*" OR "metastasised to the central nervous system*")  | 22,331  |
| #2     | TS=("erythroblastic oncogene B" OR "erbB2*" OR "erbB 2*" OR "ErbB2" OR "ErbB 2" OR "neugene*" OR "neu gene*" OR "proto-oncogene Neu*" OR "human epidermal growth factor receptor 2*" OR "HER2*" OR "HER 2*" OR "HER2/neu" OR "CD340" OR "CD 340")  | 64,660  |

| Search | Query   | Results |
|--------|---|---------|
| #1     | TS=(((“breast*” OR “mamma*”) AND (“cancer*” OR “carcinom*” OR “malignan*” OR “metasta*” OR “neoplas*” OR “tumor*” OR “tumour*”))) | 725,440 |

# = number of search step, used in Wiley/Cochrane Library, \*is added standard in open text- search terms in Wiley/Cochrane Library to broaden the search.

Table S4: Search strategy in Wiley/Cochrane Library

| Search    | Query   | Results       |
|-----------|---|---------------|
| <b>#4</b> | <b>#1 AND #2 AND #3</b>   | <b>1</b>      |
| <b>#3</b> | (“central nervous system metasta*” OR “CNS metasta*” OR “brain metasta*” OR “metastasis to the brain*” OR “metastasized to the brain” OR “metastasised to the brain” OR “metastasis to the CNS*” OR “metastasized to the CNS” OR “metastasised to the CNS” OR “metastasis to the central nervous system*” OR “metastasized to the central nervous system*” OR “metastasised to the central nervous system*”):ti,ab,kw | <b>14</b>     |
| <b>#2</b> | (“erythroblastic oncogene B” OR “erbB2*” OR “erbB 2*” OR “ErbB2” OR “ErbB 2” OR “neugene*” OR “neu gene*” OR “proto-oncogene Neu*” OR “human epidermal growth factor receptor 2*” OR “HER2*” OR “HER 2*” OR “HER2/neu” OR “CD340” OR “CD 340”):ti,ab,kw   | <b>7,240</b>  |
| <b>#1</b> | ((“breast*” OR “mamma*”):ti,ab,kw AND (“cancer*” OR “carcinom*” OR “malignan*” OR “metasta*” OR “neoplas*” OR “tumor*” OR “tumour*”):ti,ab,kw)  | <b>39,812</b> |

# = number of search step, used in Wiley/Cochrane Library, \*is added standard in open text- search terms in Wiley/Cochrane Library to broaden the search.