**Appendix.** PubMed Search Strategy.

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| --- | --- | --- |
| 1 | thoracentes\* OR thoracocentes\* OR (("pleural tap" OR paracentes\* OR "paracentesis"[mesh]) AND ("pleural diseases"[mesh] OR “pleural effusion” OR “pleural effusions”)) | 2319 |
| 2 | (( "Paracentesis/instrumentation"[Mesh] OR "Paracentesis/methods"[Mesh] OR "Paracentesis/standards"[Mesh] OR "Paracentesis/trends"[Mesh] ) AND "pleural effusion"[mesh]) OR (“paracentesis”[mesh] AND “pleural effusion”[mesh] AND (methods[sh] OR instrumentation[sh] OR trends[sh])) OR (method[tiab] OR technique[tiab] OR techniques[tiab]) | 2605944 |
| 3 | “safety”[mesh] OR “medical errors”[mesh] OR “adverse effects”[sh] OR “patient safety” OR “safety outcomes” OR “medical error” OR “medical errors” OR “adverse event” OR “adverse events” OR “adverse effect” OR “adverse effects” | 2094468 |
| 4 | Train\*[tiab] OR competenc\*[tiab] OR educat\*[tiab] OR “clinical competence”[mesh] OR education[sh] OR “education”[mesh] OR experience\*[tiab] OR master\*[tiab] OR proceduralist\*[tiab] OR checklist\*[tiab] OR “checklist”[mesh] OR “hands on”[tiab] OR “hands-on”[tiab] | 1944710 |
| 5 | Ultrasoun\* OR ultrasonograph\* OR sonograph\* OR “ultrasonography”[mesh] OR ultrasonography[sh] | 489753 |
| 6 | “reexpansion pulmonary edema” OR “re-expansion pulmonary edema” OR REPE[tiab] OR “pulmonary edema”[mesh] OR “intrapleural pressure” OR “intrapleural pressures” OR “pressure target” OR “pressure targets” | 17040 |
| 7 | 2 OR 3 OR 4 OR 5 OR 6 | 6387980 |
| 8 | 1 AND 7 | 1216 |
| 9 | ("Animals"[Mesh] NOT "Humans"[Mesh]) | 4209744 |
| 10 | 8 NOT 9 | 1170 |
| 11 | ("2000/01/01"[PDAT] : "2015/09/30"[PDAT]) | 12065340 |
| 12 | 10 AND 11 | 753 |