

## Figure S1. Search strategies

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| #8  | <b>10,480</b> #7 AND #6<br><i>Databases= WOS, DIIDW, INSPEC, KJD, MEDLINE, RSCI, SCIELO Timespan=All years Search language=Auto</i>                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
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| #6  | <b>1,912,418</b> #3 OR #2 OR #1<br><i>Databases= WOS, DIIDW, INSPEC, KJD, MEDLINE, RSCI, SCIELO Timespan=All years Search language=Auto</i>           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| #5  | <b>209,507</b> TOPIC: (meta-analysis)<br><i>Databases= WOS, DIIDW, INSPEC, KJD, MEDLINE, RSCI, SCIELO Timespan=All years Search language=Auto</i>     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| #4  | <b>276,758</b> TOPIC: (Systematic review)<br><i>Databases= WOS, DIIDW, INSPEC, KJD, MEDLINE, RSCI, SCIELO Timespan=All years Search language=Auto</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| #3  | <b>1,909,482</b> TOPIC: (muscle)<br><i>Databases= WOS, DIIDW, INSPEC, KJD, MEDLINE, RSCI, SCIELO Timespan=All years Search language=Auto</i>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| #2  | <b>2,239</b> TOPIC: (sarcopenic)<br><i>Databases= WOS, DIIDW, INSPEC, KJD, MEDLINE, RSCI, SCIELO Timespan=All years Search language=Auto</i>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| #1  | <b>13,288</b> TOPIC: (Sarcopenia)<br><i>Databases= WOS, DIIDW, INSPEC, KJD, MEDLINE, RSCI, SCIELO Timespan=All years Search language=Auto</i>         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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| 2   | (Systematic review or meta-analysis).ab. | 211500  | Advanced | <a href="#">Display Results</a> <a href="#">More ▼</a> | <input type="checkbox"/> |
| 3   | 1 and 2                                  | 3372    | Advanced | <a href="#">Display Results</a> <a href="#">More ▼</a> | <input type="checkbox"/> |

Figure S2. Flowchart of the selection process

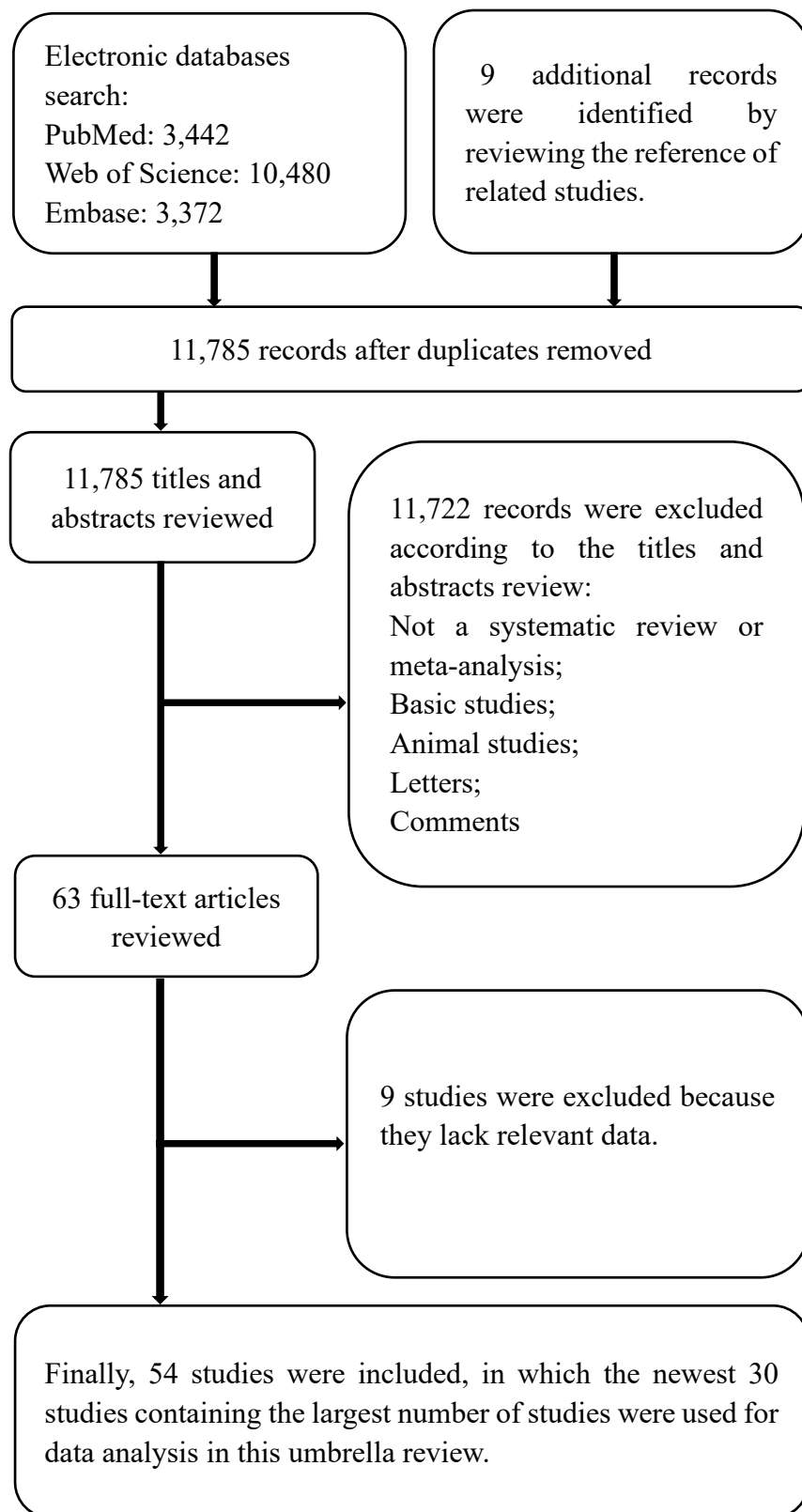


Table S1. Methodological quality assessment of included meta-analyses according to the AMSTAR

| Author                    | Year | No. of 1 | No. of 2 | No. of 3 | No. of 4 | No. of 5 | No. of 6 | No. of 7 | No. of 8 | No. of 9 | No. of 10 | No. of 11 | AMSTAR |
|---------------------------|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|--------|
| Wong, A., et al           | 2020 | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1         | 1         | 11     |
| Zhang, X. M., et al       | 2020 | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1         | 1         | 11     |
| Jia, S., et al            | 2020 | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 0         | 1         | 10     |
| Wang, P. Y., et al        | 2020 | 1        | 0        | 1        | 0        | 1        | 1        | 1        | 1        | 1        | 1         | 1         | 9      |
| Bundred, J., et al        | 2019 | 1        | 1        | 1        | 1        | 1        | 0        | 1        | 1        | 1        | 1         | 1         | 10     |
| Ida, S., et al            | 2019 | 0        | 0        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 0         | 1         | 8      |
| Su, H., et al             | 2019 | 0        | 0        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 0         | 1         | 8      |
| Ubachs, J., et al         | 2019 | 0        | 1        | 1        | 0        | 1        | 1        | 1        | 1        | 1        | 0         | 1         | 8      |
| Zhao, Y., et al           | 2019 | 0        | 0        | 0        | 1        | 0        | 1        | 1        | 1        | 1        | 0         | 1         | 6      |
| Deng, H. Y., et al        | 2019 | 0        | 1        | 1        | 1        | 0        | 1        | 1        | 1        | 1        | 1         | 1         | 9      |
| Hu, X., et al             | 2019 | 0        | 0        | 1        | 1        | 0        | 1        | 1        | 1        | 1        | 1         | 1         | 8      |
| Deng, H. Y., et al        | 2019 | 0        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 0         | 1         | 9      |
| Kamarajah, S. K., et al   | 2019 | 0        | 0        | 1        | 0        | 0        | 1        | 1        | 1        | 1        | 1         | 1         | 7      |
| Hua, H., et al            | 2019 | 0        | 1        | 0        | 1        | 0        | 1        | 1        | 1        | 1        | 0         | 1         | 7      |
| Chang, K. V., et al       | 2019 | 0        | 0        | 1        | 1        | 0        | 1        | 1        | 1        | 1        | 1         | 1         | 8      |
| Yeung, S. S. Y., et al    | 2019 | 1        | 0        | 1        | 1        | 0        | 1        | 1        | 1        | 1        | 1         | 1         | 9      |
| Zhang, X., et al          | 2019 | 1        | 1        | 1        | 1        | 0        | 1        | 1        | 1        | 1        | 0         | 1         | 9      |
| Cabett Cipolli, G., et al | 2019 | 0        | 1        | 1        | 1        | 0        | 1        | 1        | 1        | 1        | 0         | 1         | 8      |
| Chang, K. V., et al       | 2018 | 0        | 1        | 1        | 1        | 0        | 1        | 1        | 1        | 1        | 1         | 1         | 9      |
| Sun, G., et al            | 2018 | 0        | 1        | 0        | 1        | 0        | 1        | 1        | 1        | 1        | 1         | 1         | 8      |
| Yang, Z., et al           | 2018 | 0        | 1        | 0        | 0        | 1        | 1        | 1        | 1        | 1        | 0         | 1         | 7      |

|                     |      |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------------|------|---|---|---|---|---|---|---|---|---|---|---|---|
| Simonsen, C., et al | 2018 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| Zhang, H., et al    | 2018 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 7 |
| Yu, R., et al       | 2018 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 7 |
| Pan, X., et al      | 2018 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| Zhao, W. T., et al  | 2018 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 7 |
| Zhang, X., et al    | 2018 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| Kim, G., et al      | 2017 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| Chang, K. V., et al | 2017 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 7 |
| Liu, P., et al      | 2017 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |

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Table S2. Evidence quality assessment of included health-related outcomes according to the GRADE

| Outcome  | Author; year                  | Risk of bias | Inconsistency | Indirectness | Imprecision | Publication bias | Quality of evidence |
|--|-------------------------------|--------------|---------------|--------------|-------------|------------------|---------------------|
| OS (head and neck cancer)                        | Wong, A., et al; 2020         | Serious      | Not serious   | Not serious  | Not serious | Serious          | Low                 |
| All-cause mortality (breast cancer)              | Zhang, X. M., et al; 2020     | Serious      | Serious       | Not serious  | Not serious | Not serious      | Low                 |
| Non-relapse mortality (hematological malignancy) | Jia, S., et al; 2020          | Serious      | Not serious   | Not serious  | Serious     | Serious          | Very low            |
| OS (gastrointestinal cancer)                     | Su, H., et al; 2019           | Serious      | Serious       | Not serious  | Not serious | Not serious      | Low                 |
| DFS (gastrointestinal cancer)                    | Su, H., et al; 2019           | Serious      | Not serious   | Not serious  | Not serious | Not serious      | Moderate            |
| OS (pancreatic cancer)                           | Bundred, J., et al; 2019      | Serious      | Serious       | Not serious  | Serious     | Not serious      | Very low            |
| OS (gastric cancer)                              | Kamarajah, S. K., et al; 2019 | Serious      | Not serious   | Not serious  | Not serious | Not serious      | Moderate            |
| RFS (gastric cancer)                             | Kamarajah, S. K., et al; 2019 | Serious      | Not serious   | Not serious  | Serious     | Not serious      | Low                 |
| CSS (gastric cancer)                             | Kamarajah, S. K., et al; 2019 | Serious      | Not serious   | Not serious  | Serious     | Not serious      | Low                 |
| OS (esophageal cancer)                           | Deng, H. Y., et al; 2019      | Serious      | Not serious   | Not serious  | Not serious | Not serious      | Moderate            |
| DFS (esophageal cancer)                          | Deng, H. Y., et al; 2019      | Serious      | Not serious   | Not serious  | Serious     | Serious          | Very low            |
| OS (urothelial carcinoma)                        | Hu, X., et al; 2019           | Serious      | Serious       | Not serious  | Not serious | Not serious      | Low                 |

|   |                           |         |             |             |             |             |          |
|---|---------------------------|---------|-------------|-------------|-------------|-------------|----------|
| CSS (urothelial carcinoma)                                | Hu, X., et al; 2019       | Serious | Not serious | Not serious | Not serious | Not serious | Moderate |
| OS (lung cancer)  | Deng, H. Y., et al; 2019  | Serious | Serious     | Not serious | Not serious | Not serious | Low      |
| DFS (lung cancer)   | Deng, H. Y., et al; 2019  | Serious | Serious     | Not serious | Serious     | Serious     | Very low |
| OS (ovarian cancer)                                       | Ubachs, J., et al; 2019   | Serious | Not serious | Not serious | Not serious | Serious     | Low      |
| OS (colorectal cancer)                                    | Sun, G., et al; 2018      | Serious | Not serious | Not serious | Not serious | Not serious | Moderate |
| DFS (colorectal cancer)                                   | Sun, G., et al; 2018      | Serious | Not serious | Not serious | Not serious | Serious     | Low      |
| CSS (colorectal cancer)                                   | Sun, G., et al; 2018      | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| All-cause mortality (hepatocellular carcinoma)            | Chang, K. V., et al; 2018 | Serious | Not serious | Not serious | Not serious | Not serious | Moderate |
| Recurrence (hepatocellular carcinoma)                     | Chang, K. V., et al; 2018 | Serious | Not serious | Not serious | Serious     | Not serious | Low      |
| Postoperative pulmonary complications (esophageal cancer) | Wang, P. Y., et al; 2020  | Serious | Not serious | Not serious | Not serious | Not serious | Moderate |
| Anastomotic leakage (esophageal cancer)                   | Wang, P. Y., et al; 2020  | Serious | Not serious | Not serious | Serious     | Not serious | Low      |
| Overall postoperative complications (esophageal cancer)   | Wang, P. Y., et al; 2020  | Serious | Not serious | Not serious | Not serious | Not serious | Moderate |
| Rate of readmission (digestive carcinoma)                 | Hua, H., et al; 2019      | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Length of hospitalization (digestive carcinoma)           | Hua, H., et al; 2019      | Serious | Serious     | Not serious | Not serious | Serious     | Very low |

|   |                           |         |             |             |             |             |          |
|---|---------------------------|---------|-------------|-------------|-------------|-------------|----------|
| Major complications (GI cancer)                                       | Simonsen, C., et al; 2018 | Serious | Serious     | Not serious | Not serious | Serious     | Very low |
| Major complications (patients of GI cancer with ERAS care)            | Simonsen, C., et al; 2018 | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Major complications (patients of GI cancer without ERAS care)         | Simonsen, C., et al; 2018 | Serious | Serious     | Not serious | Not serious | Serious     | Very low |
| Total complications (GI cancer)                                       | Simonsen, C., et al; 2018 | Serious | Serious     | Not serious | Not serious | Not serious | Low      |
| Postoperative pneumonia (gastric cancer)                              | Yang, Z., et al; 2018     | Serious | Not serious | Not serious | Not serious | Serious     | Low      |
| Postoperative ileus (gastric cancer)                                  | Yang, Z., et al; 2018     | Serious | Not serious | Not serious | Not serious | Serious     | Low      |
| Postoperative intra-abdominal infection (gastric cancer)              | Yang, Z., et al; 2018     | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Postoperative anastomotic leakage (gastric cancer)                    | Yang, Z., et al; 2018     | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Postoperative delayed gastric emptying (gastric cancer)               | Yang, Z., et al; 2018     | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Postoperative infection (colorectal cancer)                           | Sun, G., et al; 2018      | Serious | Not serious | Not serious | Not serious | Serious     | Low      |
| Postoperative anastomotic leakage (colorectal cancer)                 | Sun, G., et al; 2018      | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Rate of hospitalization (people over 65 years old)                    | Zhao, Y., et al; 2019     | Serious | Serious     | Not serious | Not serious | Serious     | Very low |
| Rate of readmission (hospitalized people over 65 years old)           | Zhao, Y., et al; 2019     | Serious | Serious     | Not serious | Serious     | Serious     | Very low |
| Length of hospitalization (community living people over 65 years old) | Zhao, Y., et al; 2019     | Serious | Serious     | Not serious | Serious     | Serious     | Very low |

|  |                                 |         |             |             |             |             |          |
|--|---------------------------------|---------|-------------|-------------|-------------|-------------|----------|
| Risk of falls (community living people over 65 years old)                | Yeung, S. S. Y., et al; 2019    | Serious | Not serious | Not serious | Not serious | Not serious | Moderate |
| Risk of falls (people over 60 years old in nursing home)                 | Zhang, X., et al; 2019          | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Risk of fractures (people over 65 years old)                             | Yeung, S. S. Y., et al; 2019    | Serious | Serious     | Not serious | Not serious | Not serious | Low      |
| All-cause mortality (elderly people in nursing home)                     | Zhang, X., et al; 2018          | Serious | Not serious | Not serious | Not serious | Not serious | Moderate |
| All-cause mortality (community living people over 65 years old)          | Liu, P., et al; 2017            | Serious | Not serious | Not serious | Not serious | Not serious | Moderate |
| Risk of cognitive impairment (community living people over 60 years old) | Cabett Cipolli, G., et al; 2019 | Serious | Serious     | Not serious | Not serious | Serious     | Very low |
| Risk of dysphagia (people over 60 years old)                             | Zhao, W. T., et al; 2018        | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Hepatic encephalopathy (patients with liver cirrhosis)                   | Chang, K. V., et al; 2019       | Serious | Serious     | Not serious | Not serious | Serious     | Very low |
| Metabolic syndrome (middle-aged and older non-obese adults)              | Zhang, H., et al; 2018          | Serious | Serious     | Not serious | Not serious | Not serious | Low      |
| Steatohepatitis (patients with nonalcoholic fatty liver disease)         | Yu, R., et al; 2018             | Serious | Not serious | Not serious | Serious     | Serious     | Very low |
| Risk of nonalcoholic fatty liver disease                                 | Pan, X., et al; 2018            | Serious | Serious     | Not serious | Not serious | Not serious | Low      |
| Mortality of liver cirrhosis (patients with liver cirrhosis)             | Kim, G., et al; 2017            | Serious | Not serious | Not serious | Serious     | Not serious | Low      |
| Albuminuria (patients with diabetes)                                     | Ida, S., et al; 2019            | Serious | Not serious | Not serious | Not serious | Serious     | Low      |
| Risk of depression   | Chang, K. V., et al; 2017       | Serious | Serious     | Not serious | Not serious | Serious     | Very low |

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References of the 54 studies meeting the inclusion criteria of this umbrella review:

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