Supplementary Materials

1. **Search strategy**

((((((((((((((((((((Immune Checkpoint Inhibitor[Title]) OR immune therapy[Title]) OR immunotherapy[Title]) OR ipilimumab[Title]) OR tremelimumab[Title]) OR nivolumab[Title]) OR pembrolizumab[Title]) OR cemiplimab[Title]) OR atezolizumab[Title]) OR durvalumab[Title]) OR avelumab[Title]) OR cytotoxic T-lymphocyte associated antigen-4[Title]) OR CTLA-4[Title]) OR programmed cell death protein-1[Title]) OR programmed cell death protein[Title]) OR PD-1[Title]) OR programmed cell death-Ligand 1[Title]) OR PD-L1[Title])) AND ((((((((((cancer[Title]) OR carcinoma[Title]) OR neoplasm[Title]) OR leukemia[Title]) OR lymphoma[Title]) OR melanoma[Title]) OR malignancy[Title]) OR malignancies[Title]) OR tumor[Title]) OR tumors[Title])) AND (((((((versus[Title/Abstract]) OR vs[Title/Abstract]) OR compare[Title/Abstract]) OR comparison[Title/Abstract]) OR comparative[Title/Abstract]) OR comparing[Title/Abstract]) OR trial[Title/Abstract]) OR phase[Title/Abstract])) AND English[Language]) AND ("2007/01/01"[Date - Publication]: "2019/12/31"[Date - Publication])

2. **Definitions for outcomes**

The time to onset was defined as the time between the day of the first dose of immune checkpoint inhibitor drug and the onset date of a specific immune-related adverse event (irAE). The time to resolution was defined as the time from onset to complete resolution or recovery to baseline grade. The time to immune-modulation resolution was defined as the resolution time limited to patients who received immune- modulating medications, such as corticosteroids and immunosuppressive agents.

3. **The following data were collected**

First author; year of publication; study number; region; cancer type; study design; the total number of patients; the number of patients in the safety analysis, arms and treatment regimens; version of the Common Terminology Criteria for Adverse Events; follow-up time; and the median time to onset, resolution and immune-modulation resolution of each all-grade and grade ≥ 3 irAE by organ category.