

Appendix

Supporting information: additional methods and literature

Methods

Data

The IUCN Red List includes information on over 70,000 animal species. Of these, 658 were classified as ‘medicinal’ use. For IUCN species, we excluded those used only for ‘biomedical research’ and those that ‘may’ be used for medicine based on their taxonomic family. We also recorded uses additional to medicine (i.e., food, clothing, etc).

We identified additional species from a literature search using Web of Science and Google Scholar (*for search terms and processes, see Figures A1.1, A1.2*). One hundred and eighty articles we identified discussed medicinal species use and threats, and 96 offered information about specific medicinal use (n = 1140 species). Our literature review also offered specific medicinal use data not offered in the assessments of the same species listed in the IUCN database. Of 180 studies describing medicinal uses from around the world, 49 occurred in Brazil and 25 occurred in China.

From this list of species identified via the IUCN list and literature search, we categorized use into specific categories. We identified 360 ailments treated by 1151 medicinal animals. We categorized these treatments into spiritual and non-spiritual use. We found that some species (n = 180) had both spiritual and non-spiritual uses, and were coded as such in the analysis.

For species listed by the IUCN, we additionally examined patterns of endangerment. The Red List is created by multidisciplinary experts who assess the endangerment status of species as ‘Data Deficient,’ ‘Least Concern,’ ‘Near Threatened,’ ‘Vulnerable,’ ‘Endangered,’ ‘Critically

Endangered,' 'Extinct in the Wild,' or 'Extinct' (IUCN 2019). We classified species in the 'Vulnerable,' 'Endangered,' or 'Critically Endangered' categories as 'at-risk' of extinction (Scheffers et al 2019). We also examined patterns in the threats species face with a subset of species (n = 320) for which threat data exist. Threat data are unavailable for unlisted species we identified from the literature (n = 443 species) as well as 209 of the medicinal IUCN Red List species. Only 44 (~17%) of spiritual use species have threat data associated with them. Habitat data was also unavailable for ~27% of medicinal species.

Finally, we identified if medicinal use species had listed threats related to exploitation as one way to assess the degree to which medicinal, and other uses requiring exploitation of animals, may impact species. Exploitation-related threats included "hunting & collecting terrestrial animals", "intentional use (species being assessed is the target)", "fishing & harvesting aquatic resources", "intentional use: subsistence/small scale (species being assessed is the target [harvest])", and "intentional use: large scale (species being assessed is the target)[harvest]".

Spatial distributions

We examined spatial patterns in medicinal use animals. Range data for all species excluding birds were derived from the IUCN. Bird data were downloaded from Bird Life International (BirdLife International 2019). The IUCN provided polygon data classified in groups of mammals, conus, amphibians, lobsters, marine fish, reptiles, sea cucumbers, freshwater species, sharks, rays, and chimaeras. All spatial data were at a species range scale, including migratory ranges. We assumed medicinal use throughout the entire range. Such an assumption could not account for variation in use across potentially many cultural groups, or species that additionally use areas with low or non-existent populations of people.

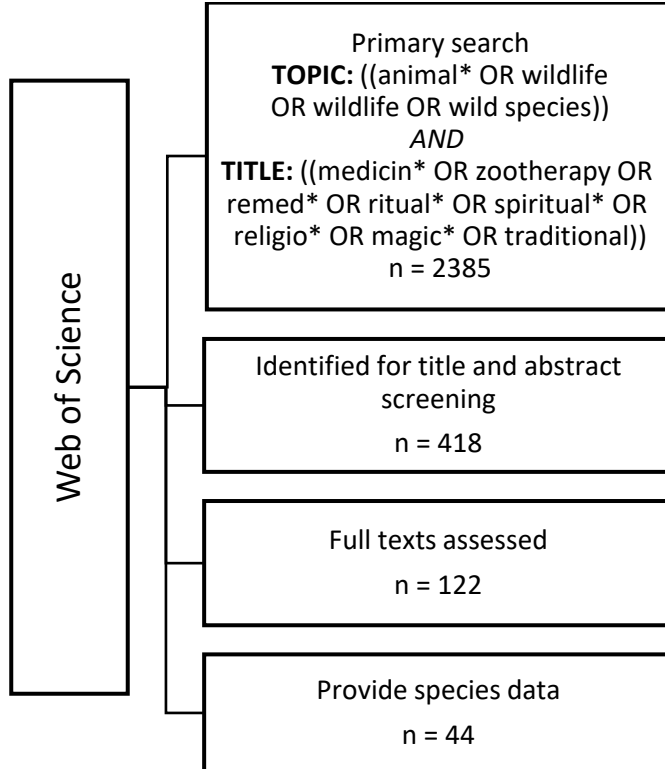


Figure A1.1: Web of Science literature search terms and process.

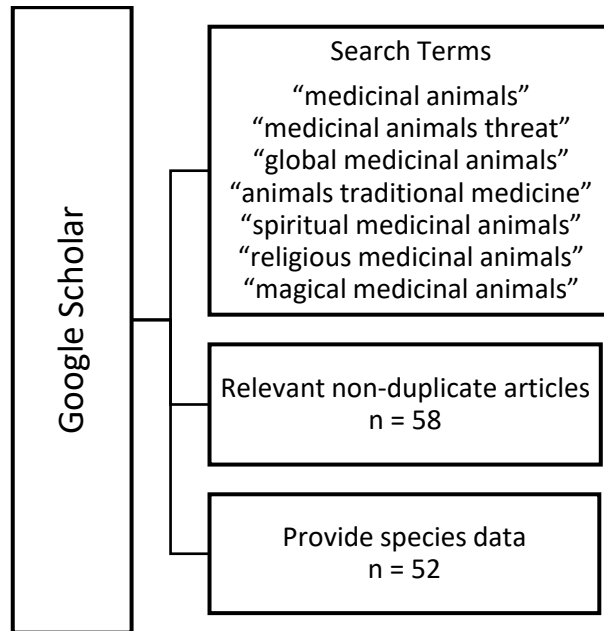


Figure A1.2: Google Scholar literature search terms and process

Supporting Literature:

The literature below provided the taxonomic and specific use data used in some analyses.

Species obtained from each source can be found in the supplementary data file.

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