

MolecularMatch Trial Search Update (July, 2019)

MolecularMatch was founded on idea of making clinical trial search better. Better for doctors, better for patients, better for health technology integrators. The scoring algorithm we developed, patented, and continually improve, is how we deliver this value.

With our search engine expertise, we have created the most clinically relevant and user friendly trial search in the industry. Our goal is that the most relevant results show up in the top 10 for any clinical oncology search. This means patients have a better chance to get the right treatment.

Trials are continually updated, scored, and sorted for you to easily incorporate into your products. You will find them in our API or Portal.

- Trial Search API
- Search Portal Application

Search Filtering

The most important factor affecting your search results is what filters are matched, and what is filtered out because of your inputs. Inputs span everything from Age, Mutation to Geo-Location and more.

Your inputs are matched to different parts of the trial like title, summary and inclusion criteria. When inputs match exclusion criteria, those trials are filtered out from the results.

The ranking of the results depends on where in the trial your filters matched, as well as being based on our curation team's efforts to boost the most important factors of trials.

Scoring System Explained

Scoring is different than filtering.

Trials are accessed through API endpoints or search portals. They are returned sorted based on a highly advanced scoring system. Through extensive testing with M.D. and Ph.D.

oversight, we've developed a search engine that is most likely to have results relevant to your case.

Scores are made up of a combination of intrinsic and extrinsic values.

Intrinsic scores are related to attributes of the trial, such as:

- 1. Trial Types (scores adjust up or down).
- 2. Phase (III > II > I)

The extrinsic score is calculated at search time by matching your search criteria to information on the trial. For example, terms matched in the title are given preference to terms found in the summary automatically. However, the curation continuously overrides this logic by adjusting the priorities of terms based on their scientific understanding of the trial.

Trial Types for score adjustments

Trial Types influence the intrinsic score.

The highest scoring trials will be those of clinical utility such as those corresponding to clinical trials (higher phases scoring higher), interventional treatments, practice guidelines, case studies, consensuses, etc. Lower scoring publications will correspond with observational research only, animal models, cell-lines, etc.

Test Suite Curation

Tuning the algorithm is a frequent task as we learn new things about trials and get additional oversight from clients and internal curation teams.

Ranking has been validated through hundreds of test suites. Test suites represent patient cases (gene/variant + condition), and we use them to check and adjust the ranking of trials so that the most relevant come up first.

Curation is also how we develop our biomedical rules engine for further tuning.

Trial Acquisition and Registry Coverage

In 2008, the World Medical Association's Declaration of Helsinki stated that, "Every clinical trial must be registered in a publicly accessible database before recruitment of the first subject." This spurred many countries to start their own clinical trial registries, or to conform to the standards of other major registries like the US's ClinicalTrials.gov. Many organizations now choose to list their trials in a major registry, their home registry, or both.

At MolecularMatch we bring in all trials and merge them into a consistent format; eliminating duplicates across registries and fill in missing data. We keep this data updated so that we can be sure to contain the majority of registered trials in a format for our algorithms to process, and for our users to distribute information to medical practices around the globe.

Public Registries Incorporated into MM Database

MolecularMatch indexes trials based on a weekly acquisition of trials from a global collection of registries.

Registry Code	Registry Name	Count
CTGOV	ClinicalTrials.gov	252,112
UMIN	University Hospital Medical Information Network (Japan)	5,179
ANZCTR	Australia/New Zealand Clinical Trials Registry	4,979
ChiCTR	Chinese Clinical Trials Registry	4,031
DRKS	German Clinical Trials Registry	3,165
IRCT	Iranian Registry of Clinical Trials	2,953
EUCTR	European Clinical Trials Registry	1,965
ISRCTN	International Standard Registry of Clinical Trials	1,855
CTRI	Indian Clinical Trials Registry	1,456
NTR	Netherlands Trial Registry	773
CRIS	Clinical Research Information Service (Korea)	476
TCTR	Thai Clinical Trials Registry	422
REBEC	Brazilian Clinical Trials Registry	374
PACTR	Pan African Clinical Trials Registry	174
JapicCTI	Japan Pharmaceutical Information Center - Clinical Trials Information	115
REPEC	Peruvian Clinical Trial Registry	70
	Japan Madical Association Contactor Clinical	

JMACCT	Trials	49
SLCTR	Sri Lanka Clinical Trials Registry	31
RPCEC	Cuban Public Registry of Clinical Trials	8
counts from: 04/10/2018		

Registry Merging

Many trials are listed on *more than one* registry. We handle that by registry priority and secondary identification. For example, if a trial coming in from UMIN has a secondary identifier that is a NCT. No. from ClinicalTrials.gov, this trial will not make into the final trial table. Instead, a link between the two are created and it is skipped because we already have it from a better source.

Trial Site Geo-Location Enhancements

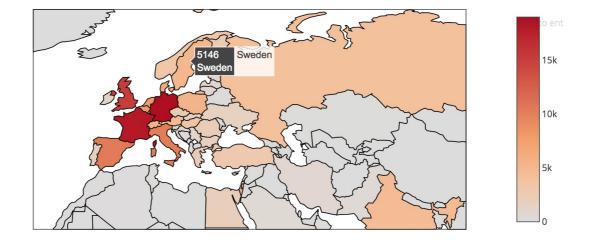
One of our biggest value additions has been our geo-location and medical group enhancements. Through Google Maps integration, we continuously find the locations of trial sites around the world. We've added millions of addresses for sites that otherwise were not given on the registry. This allows features like distance-based and medical group searches; that way you can find trials for your patients near you, or at your institution. Only with MolecularMatch is this advanced level of geo-location available.

Thousands of hospitals, universities, pharmaceutical / biotechnology companies, contract research organizations, government entities and clinics are represented in the system.

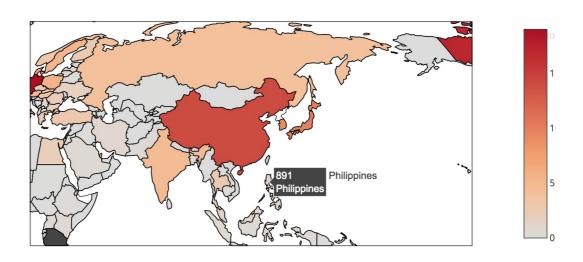
Datasets: World Map of Trials

We can easily develop datasets and analytics through our deep understanding of trial data. This data can be used by a variety of industries like medical, financial, research and pharmaceutical groups.

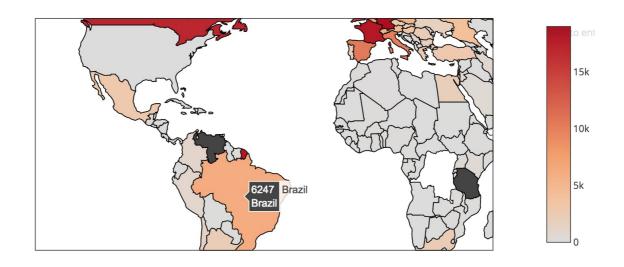
Germany, France lead Europe



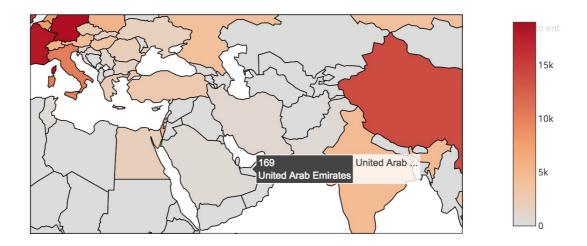
China, Japan, Korea lead Asia



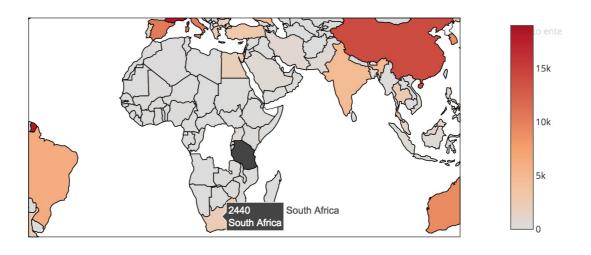
Brazil, Argentina lead South America



Turkey, Iran, Egypt lead the Middle East / North Africa region



South Africa, Uganda and Kenya lead



Total Counts - (for countries > 3 trials)

United States	100803 Thailand	2593 Pakistan	398 Zimbabwe	103 Congo	36 Madagascar	12
Germany	19008 Czech Republic	2593 Kenya	392 Morocco	98 Sudan	35 Azerbaijan	12
France	18209 South Africa	2440 Lebanon	365 Qatar	94 Benin	35 Lao People's Democratic	11
Canada	17047 Greece	2359 Indonesia	346 Nepal	87 Jamaica	35 Swaziland	11
United Kingdom	15018 Argentina	2353 Vietnam	345 Sri Lanka	84 CÃ'te D'Ivoire	33 Libyan Arab Jamahiriya	9
China	14104 New Zealand	2290 Bangladesh	283 Algeria	84 Monaco	33 Somalia	8
Spain	10424 Romania	2239 Guatemala	280 Kuwait	80 Albania	31 Solomon Islands	8
Italy	10223 Egypt	1993 Georgia	279 Cambodia	75 Malta	30 Chad	8
Japan	9845 Singapore	1908 Tanzania	253 Kazakhstan	69 Iraq	28 Yemen	8
Australia	9220 Puerto Rico	1730 Panama	249 Syrian Arab Republic	65 Paraguay	28 Barbados	8
South Korea	8787 Bulgaria	1699 Tunisia	231 Cyprus	65 Papua New Guinea	26 Central African Republic	7
Netherlands	7879 Ukraine	1679 Belarus	209 Senegal	64 Kyrgyzstan	23 Andorra	7
Belgium	7730 Portugal	1674 Malawi	185 Rwanda	62 Niger	22 Togo	7
Denmark	6263 Hong Kong	1523 Bosnia and Herzegovina	179 Botswana	62 Myanmar	21 Angola	6
Brazil	6247 Slovakia	1506 United Arab Emirates	169 Honduras	61 Afghanistan	21 Réunion	6
Israel	5933 Ireland	1442 Zambia	163 Uruguay	60 Sierra Leone	21 Fiji	6
Poland	5482 Chile	1344 Jordan	162 Cameroon	59 Martinique	20 American Samoa	5
Switzerland	5377 Colombia	1114 Costa Rica	153 Mozambique	57 Montenegro	20 Grenada	5
Sweden	5146 Malaysia	1059 Dominican Republic	151 Gambia	57 Mongolia	19 Kosovo	5
Taiwan	4773 Serbia	970 Venezuela	151 Cuba	54 Mauritius	18 Brunei Darussalam	4
India	4579 Peru	936 Moldova	132 Haiti	47 Uzbekistan	17 Mauritania	4
Austria	4466 Croatia	894 Nigeria	131 Taiwan	45 Liberia	17 Namibia	4
Russian Federatio	3995 Philippines	891 Iceland	128 Armenia	43 Bahamas	17 Former Yugoslavia	4
Hungary	3470 Estonia	844 Ghana	118 Bolivia	41 Guinea	15 Suriname	4
Norway	3183 Lithuania	838 Macedonia	118 Guinea-Bissau	41 Belize	14 Equatorial Guinea	4
Iran	3756 Iran	798 Burkina Faso	116 Republic of the Congo	41 Lesotho	13 Bhutan	4
Mexico	2922 Latvia	781 Mali	115 El Salvador	41 Burundi	12 Guyana	3
Turkey	2824 Slovenia	564 Luxembourg	112 Bahrain	39 Trinidad and Tobago	12 Timor-Leste	3
Finland	2614 Saudi Arabia	525 Ecuador	112 Oman	39 Guadeloupe	12 Taiwan	3
	Uganda	403 Ethiopia	110 Gabon	37 Nicaragua	12 Western Sahara	3

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