



# FAIR for Fair Sharing of Immunological Data

March 29, 2024



# Agenda

- Welcome & Introductions (5 min)
- Presentation: FAIR for Fair Sharing of Immunological Data (40 min)
  - ImmPort Overview
  - FAIR Principles & ImmPort Data
  - Benefits & Outcomes of FAIR Data Sharing
- Q & A (15 min)

## ImmPort Team

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### Funding Support

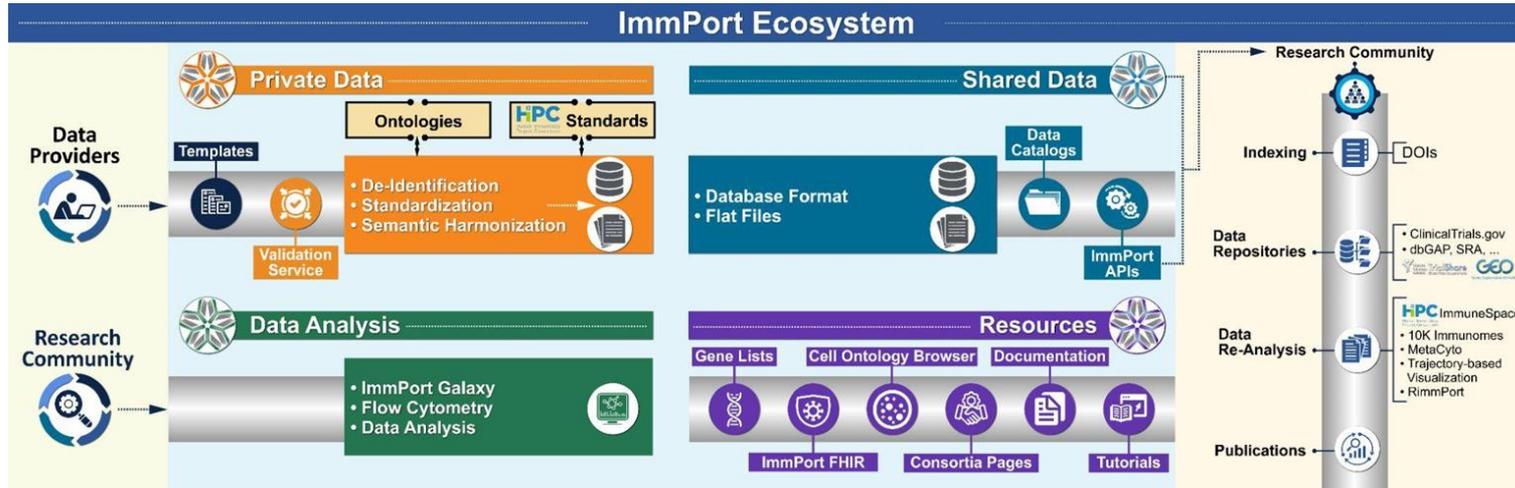
National Institute of Allergy and  
Infectious Diseases (NIAID)  
National Institutes of Health (NIH)  
Health and Human Services (HHS)  
Contract #: HHSN316201200036W

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# What is ImmPort? (import.org)

## Immunology Database and Analysis Portal

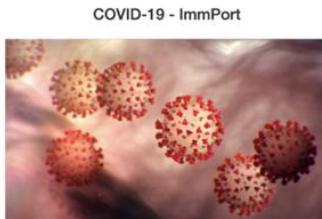
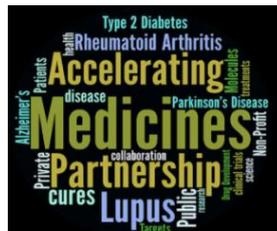


- NIAID-funded resource for sharing immunology **research and clinical trials data** developed by the Division of Allergy, Immunology, and Transplantation (DAIT)
- Facilitates inter- and intra-study analysis via a data model that captures a robust set of descriptive elements with standardized terms across publicly-shared studies
- Focuses on studies of autoimmunity, infection and vaccine response, transplantation, and allergy

# ImmPort Shares Data from Major NIAID-funded Programs and External Organizations



## Human Immunology Project Consortium



COVID-19 - ImmPort

Image CDC Coronavirus Disease 2019 - COVID 19, Alissa Eckert

## Coronavirus Disease 19

Powered by ImmPort



Clinical Trials in Organ Transplantation in Children (CTOT-C) Public



- Immunophenotyping Assessment in a COVID-19 Cohort (IMPACC)
- Serological Sciences Network (SeroNet)
- Multisystem Inflammatory Syndrome in Children (MIS-C)
- Impact of Initial Influenza Exposure on Immunity in Infants (U01)
- Atopic Dermatitis Research Network (ADRN)
- Population Genetics Analysis Program
- Protective Immunity for Special Populations
- HLA Region Genomics in Immune-mediated Diseases
- Modeling Immunity for Biodefense
- Reagent Development for Innate Immune Receptors
- Adjuvant Development Program
- Immunity in Neonates and Infants
- Asthma and Allergic Diseases Cooperative Research Centers
- HLA and KIR Region Genomics in Immune-Mediated Diseases
- Cooperative Study Group for Autoimmune Disease Prevention
- Immunobiology of Xenotransplantation
- Centers for Medical Countermeasures against Radiation Consortium
- Inner City Asthma Consortium
- Systems Approach to Immunity and Inflammation
- Innate Immune Receptors and Adjuvant Discovery Program
- Maintenance of Macaque Specific Pathogen-Free Breeding Colonies
- Consortium for Food Allergy Research
- Development of Sample Sparing Assays for Monitoring Immune Responses (U24)
- Asthma and Allergic Diseases Clinical Research Consortium (AACRC)
- The Clinical Islet Transplantation (CIT) Consortium
- Autoimmunity Centers of Excellence (ACE)
- Clinical Trials in Organ Transplantation (CTOC)
- Human Immunology Project Consortium (HIPC)
- Collaborative Influenza Vaccine Innovation Centers (CIVICS)
- Centers for Research in Emerging and Infectious Diseases (CREID)
- Cooperative Centers on Human Immunology
- Impact of Initial Influenza Exposure on Immunity in Infants (U01)
- A Multidisciplinary Approach to Study Vaccine-elicited Immunity and Efficacy Against Malaria (MVIE)

20 Years of FAIR Data Sharing



<https://doi.org/10.17616/R30J3F>

Nature Scientific Data's Recommended Data Repository Cytometry & Immunology

PLOS ONE Recommended Data Repository



### FAIR Principles

Make your data:

- Findable
- Accessible
- Interoperable
- Reusable

**Findable**

- Descriptive metadata
- Persistent identifiers

**Accessible**

- Determining what to share
- Participant consent and risk management
- Access status

**Interoperable**

- XML standards
- Data Documentation Initiative
- CDISC

**Reusable**

- Rights and license stipels
- Permitted and non-permitted use

<http://datafairport.org/>

**Data FAIRport**  
Find, Access, Interoperate & Re-use Data

- ImmPort currently shares over 900 studies encompassing a range of research areas, species & assay types.

Studies 927	Subjects 100062	Diseases 161
Experiments 3552	Total Results 7016441	Lab Tests 1285908



<https://import.org/shared/search>

## Findable

The first step in (re)using data is to find them. Metadata and data should be easy to find for both humans and computers. Machine-readable metadata are essential for automatic discovery of datasets and services, so this is an essential component of the FAIRification process.

**F1. (Meta)data are assigned a globally unique and persistent identifier.**

**F2. Data are described with rich metadata (defined by R1 below).**

**F3. Metadata clearly and explicitly include the identifier of the data they describe.**

**F4. (Meta)data are registered or indexed in a searchable resource.**

## Accessible

Once the user finds the required data, she/he/they need to know how they can be accessed, possibly including authentication and authorisation.

**A1. (Meta)data are retrievable by their identifier using a standardised communications protocol.**

**A1.1 The protocol is open, free, and universally implementable.**

**A1.2 The protocol allows for an authentication and authorisation procedure, where necessary.**

**A2. Metadata are accessible, even when the data are no longer available.**

## Interoperable

The data usually need to be integrated with other data. In addition, the data need to interoperate with applications or workflows for analysis, storage, and processing.

**I1. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.**

**I2. (Meta)data use vocabularies that follow FAIR principles.**

**I3. (Meta)data include qualified references to other (meta)data.**

## Reusable

The ultimate goal of FAIR is to optimise the reuse of data. To achieve this, metadata and data should be well-described so that they can be replicated and/or combined in different settings.

**R1. (Meta)data are richly described with a plurality of accurate and relevant attributes.**

**R1.1. (Meta)data are released with a clear and accessible data usage license.**

**R1.2. (Meta)data are associated with detailed provenance.**

**R1.3. (Meta)data meet domain-relevant community standards.**

[The FAIR Guiding Principles for scientific data management and stewardship | Scientific Data \(nature.com\)](#)



# Digital Object Identifiers (DOIs) and Other Persistent Identifiers (PIs)

Each ImmPort study receives an accession

A DOI is assigned when the data is shared

SDY1464 - T cell responses to H1N1v and a longitudinal study of seasonal influenza vaccination SLVP015 2014

Download

Summary Design Adverse Event Assessment Interventions Medications Substance Demographics Lab Tests Mechanistic Assays Study Files

+ -

Summary

Accession	SDY1464
Title	T cell responses to H1N1v and a longitudinal study of seasonal influenza vaccination SLVP015 2014
DOI	10.21430/M3AUKDIXFI
Brief Description	Systems biology approach to examine effects of seasonal flu vaccination in adults of different ages on gene expression, cytokine stimulation and serum cytokines with parameters such as immune senescence to uncover new markers and mechanisms behind failure of immune function in many older people.
Research Focus	Vaccine Response
Condition Studied	Aging, influenza, influenza, swine influenza
Start Date	2013-01-01
Detailed Description	Systems biology approach to examine effects of seasonal flu vaccination in adults of different ages on gene expression, cytokine stimulation and serum cytokines with parameters such as immune senescence to uncover new markers and mechanisms behind failure of immune function in many older people.

ImmPort captures Open Research and Contributor ID (ORCID)

ImmPort integrates PubMed Identifier (PMID) for associated publications

Linking for other identifiers or related information

Personnel

Role	First Name	Last Name	Title	Organization
Principal Investigator	Mark	Davis	Principal Investigator	Stanford University

Publications

Pubmed Id	Title	Journal	Year	Month	Issue	Pages	Authors
30842675	A clinically meaningful metric of immune age derived from high-dimensional longitudinal monitoring.	Nature medicine	2019	Mar	25(3)	487-495	Alpert A, Pickman Y, Leipold M, Rosenberg-Hasson Y, Ji X, Gaujoux R, Rabani H, Starosvetsky E, Kvelev K, Schaffert S, Furman D, Caspi O, Rosenschein U, Khatri P, Dekker CL, Maecker HT, Davis MM, Shen-Orr SS
31636302	The FluPRINT dataset, a multidimensional analysis of the influenza vaccine imprint on the immune system.	Scientific data	2019	Oct	6(1)	214	Tomic A, Tomic I, Dekker CL, Maecker HT, Davis MM

Study Links

Type	Name	Value
	ClinicalTrials.gov	<a href="https://clinicaltrials.gov/ct2/show/NCT01827462">https://clinicaltrials.gov/ct2/show/NCT01827462</a>

Adherence to FAIR principles increases the visibility of your data!

ImmPort Search – Cohort Discovery Tool (CDT)

The screenshot shows the ImmPort Search interface. On the left, there are filter panels for 'Study Facets' (Research Focus, Biosample Type, Assay Methods, Program Name, Study Accession) and 'Subject Demographics' (Age (Years), Ethnicity, Gender, Race, Species). A search bar at the top contains the text 'e.g. Influenza, COVID-19, Rheumatoid, Lupus, MBAA... (minimum 3 characters)'. Below the search bar, there are three facet charts: 'Research Focus' (a bar chart showing 'Influenza' as the most frequent focus), 'Condition or Disease' (a donut chart showing 'COVID-19 (262)' as the most frequent condition), and 'Assay Methods' (a donut chart showing 'Flow Cytometry (327)' as the most frequent method). Below the charts is a table of results with columns: Study, Title, Pubmed Id, Research Focus, Condition/Disease, Assay Methods, Latest Release Version, and Program Name. The first row shows a study titled 'Systems Biology of 2007 Influenza Vaccination in Humans' with a research focus of 'Vaccine Response' and a condition of 'influenza'.

<https://import.org/shared/search>

Additional Repositories and Search Engines



## ImmPort Registration & Login

- ImmPort study metadata (CDT Search) is browsable without login
- Registration and acceptance of Data Use Agreement is required to upload or download data
- Registration is free, simple, and immediate

## ImmPort Application Programming Interfaces (APIs)

<https://docs.immport.org/apidocumentation/>

- ImmPort offers several APIs with detailed documentaiton for use

<https://www.immport.org/auth/login>

## Interoperable



# ImmPort Submission Templates – integrated data standards...

<https://docs.immport.org/datasubmission/general/submissiontemplates/>

subjecthumans	Schema Version 3.36													
Please do not delete or edit this column														
Column Name	Subject ID	Arm Or Cohort ID	Gender	Min Subject Age	Max Subject Age	Age Unit	Age Event	Age Event Specify	Subject Phenotype	Subject Location	Ethnicity	Race	Race Specify	Description

immuexpo	Schema Version 3.36							
Please do not delete or edit this column								
Column Name	Subject ID	Arm Or Cohort ID	Exposure Process Reported	Exposure Material Reported	Exposure Material ID	Disease Reported	Disease Ontology ID	Disease Stage Reported

cytof	Schema Version 3.36													
Please do not delete or edit this column														
Column Name	Expsample ID	Biosample ID	Experiment ID	Reagent ID(s)	Treatment ID(s)	Result File Name	Expsample Name	Expsample Description	Additional Result File Names	Study ID	Protocol ID(s)	Subject ID	Planned Visit ID	Type

Controlled terminology drop downs

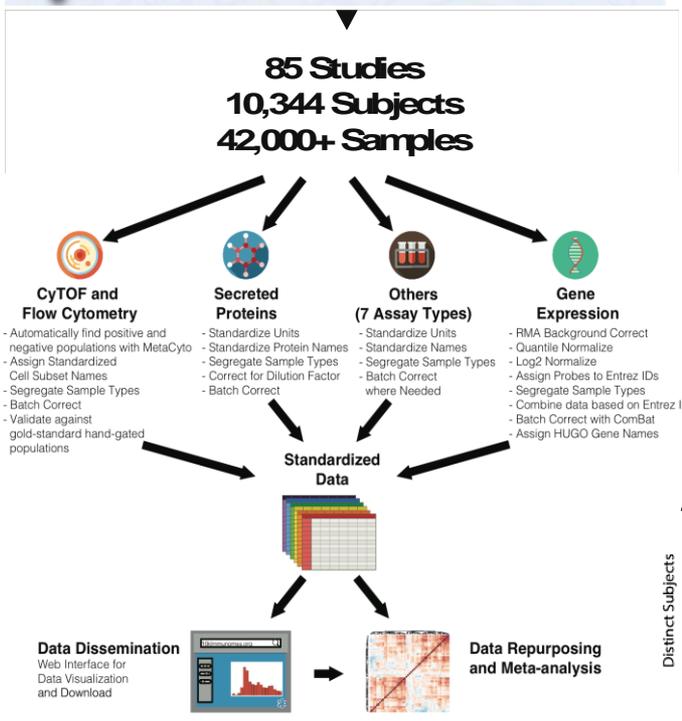
# ImmPort Leverages Ontologies for Controlled Vocabulary

Brenda Tissue Ontology	National Cancer Institute Thesaurus
Chemical Entities of Biological Interest Ontology	Ontology for Biomedical Investigations
Clinical Methods Ontology	Ontology for General Medical Science
Cell Ontology	Ontology for MIRNA Target
Cell Line Ontology	The Ontology for Immune Epitomes
Clinical Measurement Ontology	Phenotype And Trait Ontology
Disease Ontology	Protein Ontology
Foundational Model Ontology	RxNorm
Gazetteer	SNOMED CT
Gene Ontology	The Statistical Methods Ontology
Human Gene Dataset (including HUGO)	Symptom Ontology
Human Metabolome Database	Uberon Multi-species anatomy Ontology
Human Phenotype Ontology	Uniprot
Medical Dictionary for Regulatory Activities Terminology	Units of Measurement Ontology
Mouse Gene Dataset	Vaccine Ontology
NCBI Taxonomy	

## Data available in the 10,000 Immunomes Project

<b>Total Samples</b>	<b>42117</b>
<b>Total Distinct Subjects</b>	<b>10344</b>
<b>MEASUREMENT SUBJECTS</b>	
<b>Secreted Proteins</b>	4835
<i>ELISA</i>	4035
<i>Multiplex ELISA</i>	1286
<b>Virus Titer</b>	3609
<i>Virus Neutralization Titer</i>	2265
<i>HAI Titer</i>	1344
<b>Clinical Lab Tests</b>	2639
<i>Complete Blood Count</i>	1684
<i>Comprehensive Metabolic Panel</i>	664
<i>Fasting Lipid Profile</i>	664
<b>Questionnaire</b>	1422
<b>Cytometry</b>	1415
<i>Flow Cytometry (PBMC)</i>	907
<i>CyTOF (PBMC)</i>	583
<i>Flow Cytometry (Whole Blood)</i>	164
<b>HLA Type</b>	1093
<b>Gene Expression Array</b>	476
<i>Whole Blood</i>	311
<i>PBMC</i>	165

## 10,000 Immunomes

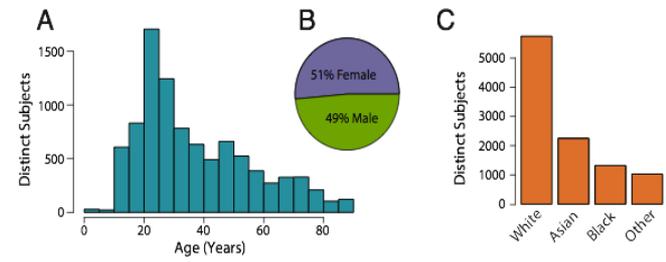


## Cell Reports

Volume 25, Issue 2, 9 October 2018, Pages 513-522.e3  
open access

Resource  
The 10,000 Immunomes Project: Building a Resource for Human Immunology  
Kelly A. Zalocusky<sup>1,2</sup>, Matthew J. Kan<sup>1,2</sup>, Zicheng Hu<sup>1,2</sup>, Patrick Dunn<sup>3</sup>, Elizabeth Thomson<sup>3</sup>, Jeffrey Wisner<sup>3</sup>, Sanchita Bhattacharya<sup>1,2,4</sup>, Atul J. Butte<sup>1,2,4,5,6</sup>

- Large, diverse, cleaned reference dataset derived from ImmPort studies
- Interactive data visualization
- Custom control cohorts and standardized data download



# Interoperability with Other Resources

FHIR Resources (R0)	ImmPort Templates and Data Elements
Observation	Lab Test Component, Assessments Component
Specimen	Subject, Biosample type
Patient	Subject (Human), gender, race, ethnicity
ResearchSubject	Linking Identifiers of Study, Subject, and Amicohort
DiagnosticReport	Lab Tests Panel, Assessments Panel, and link to the components
PractitionerRole	Study Personnel
	Subject, species, arm name, arm type
	Study Personnel



- To further interoperability, ImmPort data is being mapped to Fast Healthcare Interoperability Resources (FHIR) format
- Users can explore ImmPort data in FHIR format using the ImmPort HAPI FHIR server

<https://fhir.immport.org/>

Name	Value
ClinicalTrials.gov	<a href="https://clinicaltrials.gov/ct2/show/NCT00114881">https://clinicaltrials.gov/ct2/show/NCT00114881</a>
SRA SRP102104	<a href="https://trace.ncbi.nlm.nih.gov/Traces/?view=study&amp;acc=SRP102104">https://trace.ncbi.nlm.nih.gov/Traces/?view=study&amp;acc=SRP102104</a>
GEO GSE96783	<a href="https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE96783">https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE96783</a>
BioProject	<a href="https://www.ncbi.nlm.nih.gov/bioproject/PRJNA379624">https://www.ncbi.nlm.nih.gov/bioproject/PRJNA379624</a>
SRA SRP249918	<a href="https://trace.ncbi.nlm.nih.gov/Traces/?view=study&amp;acc=SRP249918">https://trace.ncbi.nlm.nih.gov/Traces/?view=study&amp;acc=SRP249918</a>
GEO GSE145505	<a href="https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE145505">https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE145505</a>
BioProject	<a href="https://www.ncbi.nlm.nih.gov/bioproject/PRJNA607333">https://www.ncbi.nlm.nih.gov/bioproject/PRJNA607333</a>
dbGaP	<a href="https://www.ncbi.nlm.nih.gov/projects/gap/cgi-bin/study.cgi?study_id=phs002921.v2.p1">https://www.ncbi.nlm.nih.gov/projects/gap/cgi-bin/study.cgi?study_id=phs002921.v2.p1</a>
GEO GSE132181	<a href="https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE132181">https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE132181</a>
BioProject	<a href="https://www.ncbi.nlm.nih.gov/bioproject/PRJNA546267">https://www.ncbi.nlm.nih.gov/bioproject/PRJNA546267</a>
Related study - GSE96783	<a href="https://www.immport.org/shared/search?text=sdyl025">https://www.immport.org/shared/search?text=sdyl025</a>

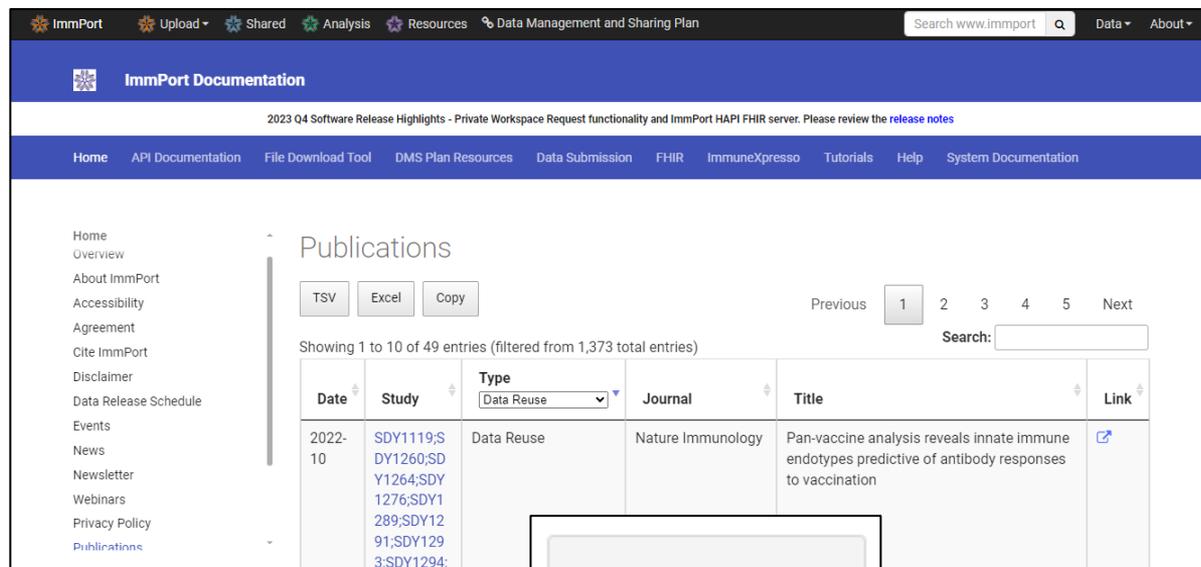


Series GSE145505		Query DataSets for GSE145505
Status	Public on Apr 01, 2021	
Title	Endotype of Allergic Asthma with Airway Obstruction in Urban Children	
Organism	<a href="#">Homo sapiens</a>	
Experiment type	Expression profiling by high throughput sequencing	

- ImmPort subject and sample metadata can be mapped to GEO subject metadata, creating a larger dataset for studies that have data in both repositories

## Reusable

# ImmPort-related Publications



ImmPort Upload Shared Analysis Resources Data Management and Sharing Plan Search www.immport Data About

ImmPort Documentation

2023 Q4 Software Release Highlights - Private Workspace Request functionality and ImmPort HAPI FHIR server. Please review the [release notes](#)

Home API Documentation File Download Tool DMS Plan Resources Data Submission FHIR ImmuneXpresso Tutorials Help System Documentation

Home Overview About ImmPort Accessibility Agreement Cite ImmPort Disclaimer Data Release Schedule Events News Newsletter Webinars Privacy Policy Publications

## Publications

TSV Excel Copy

Previous 1 2 3 4 5 Next

Showing 1 to 10 of 49 entries (filtered from 1,373 total entries)

Search:

Date	Study	Type	Journal	Title	Link
2022-10	SDY1119;SDY1260;SDY1264;SDY1276;SDY1289;SDY1291;SDY1293;SDY1294	Data Reuse	Nature Immunology	Pan-vaccine analysis reveals innate immune endotypes predictive of antibody responses to vaccination	<a href="#">Link</a>

Publications

<https://docs.immport.org/home/publications/>

Article | Published: 12 July 2021

## Systems vaccinology of the BNT162b2 mRNA vaccine in humans

Prabhu S. Arunachalam, Madeleine K. D. Scott, [...]Bali Pulendran

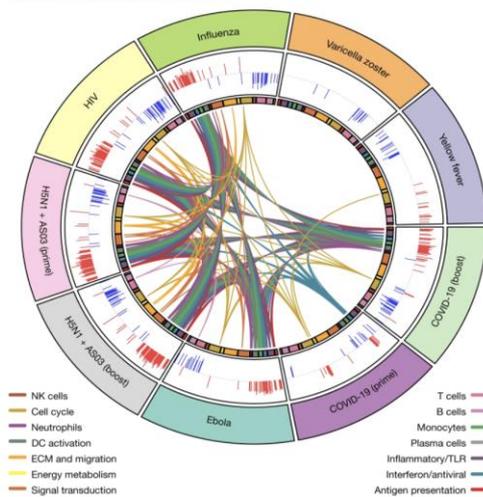
*Nature* **596**, 410–416 (2021) | [Cite this article](#)

**61k** Accesses | **1109** Altmetric | [Metrics](#)

PMID: 34252919 | PMCID: PMC8761119 | DOI: [10.1038/s41586-021-03791-x](https://doi.org/10.1038/s41586-021-03791-x)

**Fig. 5: Comparison of transcriptional responses with other vaccines.**

From: Systems vaccinology of the BNT162b2 mRNA vaccine in humans



## Online attention



- 2556 tweeters
- 6 blogs
- 2 Facebook pages
- 64 news outlets
- 11 Redditors
- 1 F1000
- 1 Video uploaders
- 396 Mendeley

## Extended Data Table 3 Vaccine meta-analysis datasets

From: Systems vaccinology of the BNT162b2 mRNA vaccine in humans

Vaccine	Pathogen	Vaccine Type	Adjuvant/ Vector	Timepoints used	N	GEO/ ImmPort
BNT162b2	SARS-CoV-2	mRNA	mRNA-LNP	0,1,7, 21,22,28	31	GSE169159
TIV	Seasonal Influenza	Inactivated	None	0,1,7	19	GSE74813/ SDY56
VZV	Varicella zoster	Live attenuated	VZV	0,1,7	31	GSE79396/ SDY984
YF17D	Yellow fever	Live attenuated	YF17D	0,1,7	25	GSE13486/ SDY1264
rVSV-ZEBOV (high dose)	Ebola	Recombinant viral vector	VSV	0,1,7	7	GSE97590/ SDY1373
MRKAd5/HIV	HIV	Recombinant viral vector	Ad5	0,1,7	10	GSE22768/ SDY1291
H5N1+AS03	H5N1 Influenza	Inactivated	AS03	0,1,7, 21,22,28	33	GSE102012
MPSV4	Meningococcus	Polysaccharide	None	0,7	13	GSE52245/ SDY1260
MCV4	Meningococcus	Conjugate	None	0,7	17	GSE52245/ SDY1260

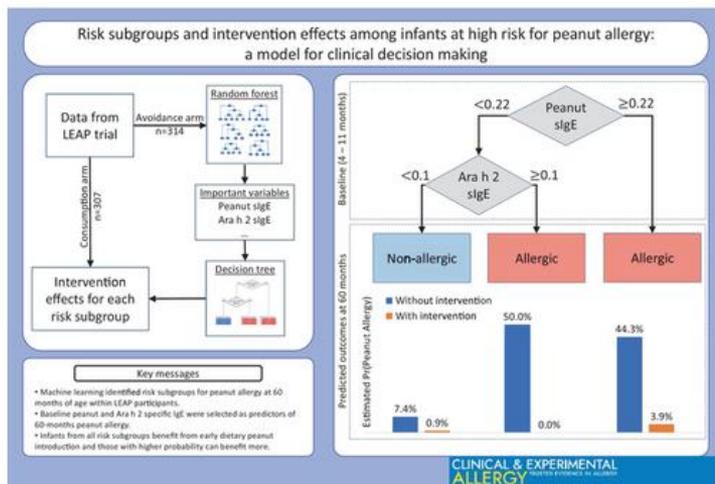
> Clin Exp Allergy. 2024 Mar;54(3):185-194. doi: 10.1111/cea.14452. Epub 2024 Jan 19.

## Risk subgroups and intervention effects among infants at high risk for peanut allergy: A model for clinical decision making

Yuxiang Li<sup>1 2</sup>, Ashley Devonshire<sup>3 4</sup>, Bin Huang<sup>1 3</sup>, Sandra Andorf<sup>1 3 4 5</sup>

Affiliations + expand

PMID: 38243616 PMID: PMC10932885 (available on 2025-03-01) DOI: 10.1111/cea.14452



## Background

The Learning Early About Peanut Allergy (LEAP) trial showed that early dietary introduction of peanut reduced the risk of developing peanut allergy by age 60 months in infants at high risk for peanut allergy. In this secondary analysis of LEAP data, we aimed to determine risk subgroups within these infants and estimate their respective intervention effects of early peanut introduction.

## Key messages

- Machine learning identified risk subgroups for peanut allergy at 60 months within LEAP participants.
- Baseline peanut and Ara h 2-specific-IgE were selected as predictors of 60-months peanut allergy.
- Infants with higher predicted probability of peanut allergy benefit more from the early introduction intervention.

The individual participant-level data of LEAP are made available through ImmPort (SDY660) and ITN TrialShare (ITN032AD, [www.itntrialshare.org](http://www.itntrialshare.org)) from where the data were retrieved.<sup>23-25</sup> More details about the study population and data preprocessing can be found in the Supplemental methods and Table S1.

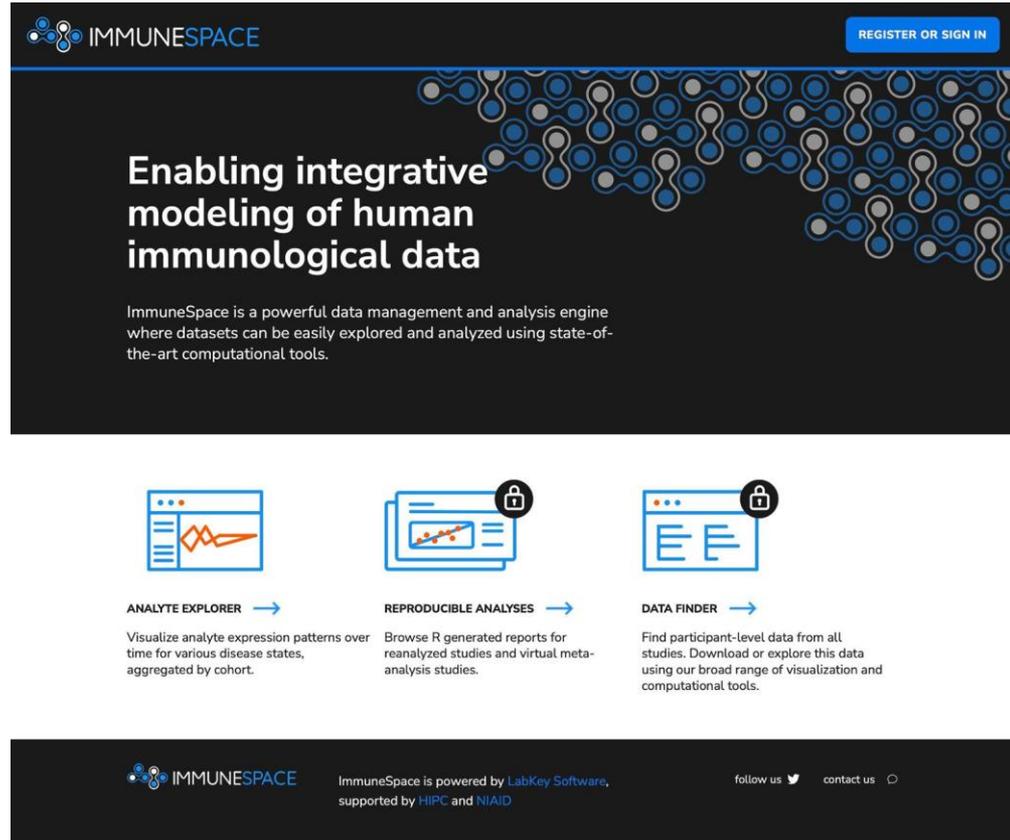
## Human Immunology Project Consortium (HIPC)

HIPC's ImmuneSpace extends ImmPort, providing access to additional data (e.g., standardized gene expression matrices) and web-based R tools for data accession, analysis, and reporting.

Studies in the Immune Signatures Data Resource are archived through the Shared Data Portal on ImmPort and ImmuneSpace repositories and may be updated over time.



<https://immunespace.org>



The banner features a dark background with a blue and white pattern of interconnected circles and lines on the right side. At the top left is the 'IMMUNESPACE' logo, and at the top right is a 'REGISTER OR SIGN IN' button. The main text reads 'Enabling integrative modeling of human immunological data'. Below this is a descriptive paragraph: 'ImmuneSpace is a powerful data management and analysis engine where datasets can be easily explored and analyzed using state-of-the-art computational tools.' Three feature cards are shown below: 'ANALYTE EXPLORER' with a line graph icon, 'REPRODUCIBLE ANALYSES' with a document icon and a lock, and 'DATA FINDER' with a document icon and a lock. Each card has a right-pointing arrow and a brief description of its function.

IMMUNESPACE

REGISTER OR SIGN IN

### Enabling integrative modeling of human immunological data

ImmuneSpace is a powerful data management and analysis engine where datasets can be easily explored and analyzed using state-of-the-art computational tools.

- ANALYTE EXPLORER** → Visualize analyte expression patterns over time for various disease states, aggregated by cohort.
- REPRODUCIBLE ANALYSES** → Browse R generated reports for reanalyzed studies and virtual meta-analysis studies.
- DATA FINDER** → Find participant-level data from all studies. Download or explore this data using our broad range of visualization and computational tools.

IMMUNESPACE

ImmuneSpace is powered by LabKey Software, supported by HIPC and NIAID

follow us  contact us 

# Example of AI-ready ImmPort Data: Re-analysis of 10K Immunomes CyTOF Data Using GPT4

ChatGPT Prompt:

ChatGPT Response:

SA

Find if there are any age related differences across cell types

---

SA

To determine if there are age-related differences across cell types, we can employ a few strategies:

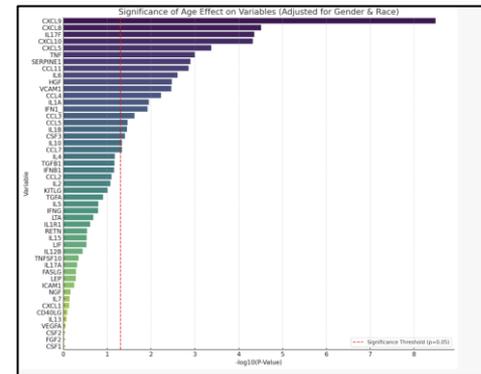
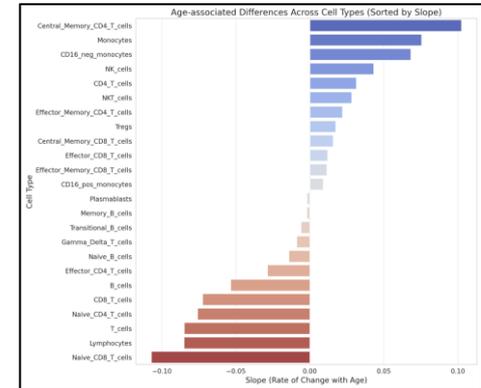
1. **Visualization:** We can create scatter plots for each cell type against age to visually assess any trends.
2. **Correlation Analysis:** Compute the correlation coefficient between age and each cell type to quantify the strength and direction of the relationship.
3. **Statistical Testing:** Perform regression analysis or other statistical tests to determine if the observed relationships are statistically significant.

Let's start with the visualization to see if we can visually observe any patterns. We'll create scatter plots for each cell type against age.

Finished working
Show work



Additional ChatGPT Response:



**AI can analyze large scale cytometry datasets with ease, even adjusting for confounding variables**

- Age-associated differences in cell types
- Age- and gender-associated effects on cytokines

## Additional Considerations

<https://docs.immport.org/dmsp/>

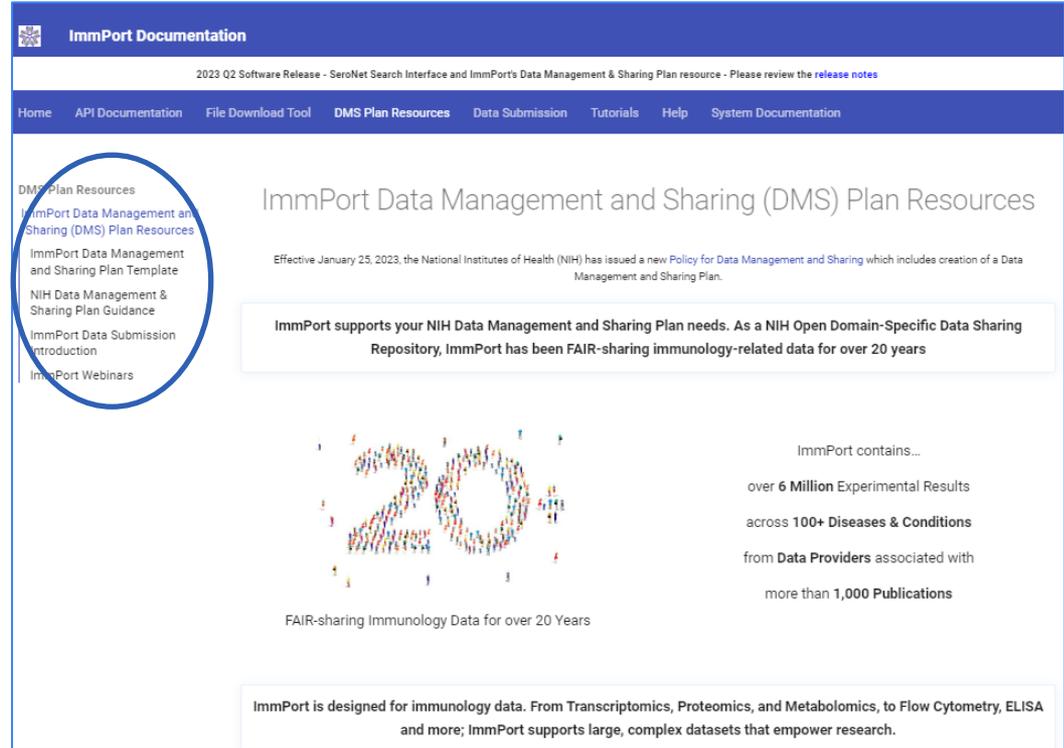
## NIH data sharing policy:

<https://grants.nih.gov/grants/guide/notice-files/NOT-OD-21-013.html>

Effective January 25<sup>th</sup>, 2023.

## Primary takeaways:

- ImmPort Data Management and Sharing Plan (DMSP) page provides helpful resources for researchers drafting DMSPs
- Selecting a repository that follows FAIR data principles supports Data Management and Sharing Planning



ImmPort Documentation

2023 Q2 Software Release - SeroNet Search Interface and ImmPort's Data Management & Sharing Plan resource - Please review the [release notes](#)

Home API Documentation File Download Tool **DMS Plan Resources** Data Submission Tutorials Help System Documentation

DMS Plan Resources  
ImmPort Data Management and Sharing (DMS) Plan Resources  
ImmPort Data Management and Sharing Plan Template  
NIH Data Management & Sharing Plan Guidance  
ImmPort Data Submission Introduction  
ImmPort Webinars

## ImmPort Data Management and Sharing (DMS) Plan Resources

Effective January 25, 2023, the National Institutes of Health (NIH) has issued a new [Policy for Data Management and Sharing](#) which includes creation of a Data Management and Sharing Plan.

**ImmPort supports your NIH Data Management and Sharing Plan needs. As a NIH Open Domain-Specific Data Sharing Repository, ImmPort has been FAIR-sharing immunology-related data for over 20 years**



FAIR-sharing Immunology Data for over 20 Years

ImmPort contains...

- over 6 Million Experimental Results
- across 100+ Diseases & Conditions
- from Data Providers associated with more than 1,000 Publications

**ImmPort is designed for immunology data. From Transcriptomics, Proteomics, and Metabolomics, to Flow Cytometry, ELISA and more; ImmPort supports large, complex datasets that empower research.**

# ImmPort Documentation

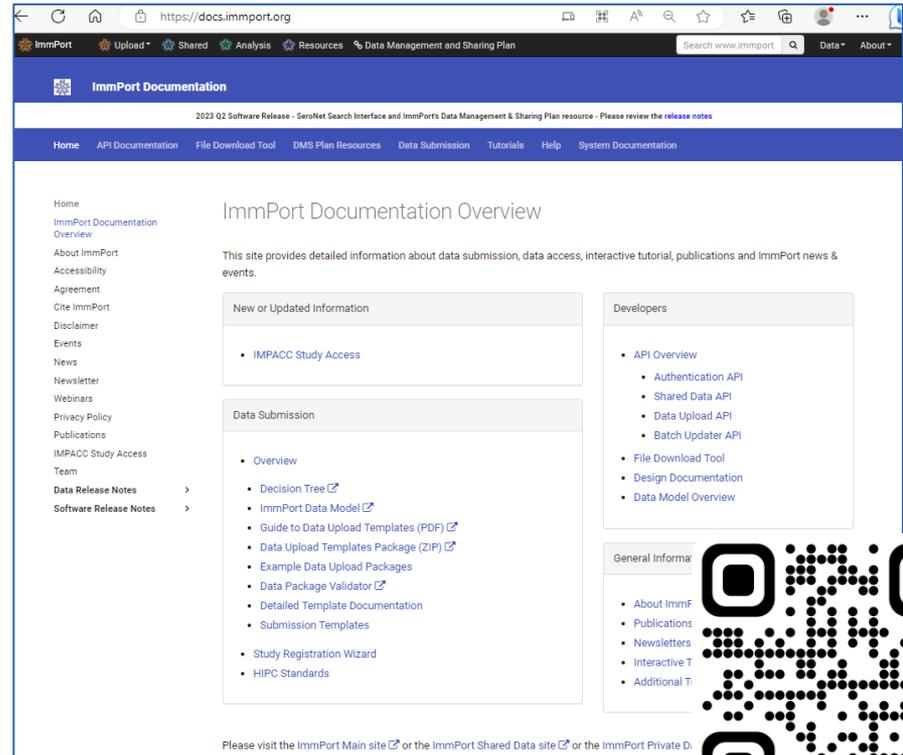
<https://docs.immport.org/>

ImmPort documentation available in one place –  
ImmPort Resources



Find helpful information about

- New Features
- Data Submission
- Using the API
- ImmPort Tutorials
- How to Cite ImmPort Datasets
- Newsletter Signup
- Past Webinars & Upcoming Events



The screenshot shows the ImmPort Documentation website in a browser. The URL is <https://docs.immport.org/>. The page has a blue header with navigation links: Home, API Documentation, File Download Tool, DMS Plan Resources, Data Submission, Tutorials, Help, System Documentation. The main content area is titled 'ImmPort Documentation Overview' and includes a sidebar with a table of contents (Home, Overview, About ImmPort, Accessibility, Agreement, Cite ImmPort, Disclaimer, Events, News, Newsletter, Webinars, Privacy Policy, Publications, IMPACC Study Access, Team, Data Release Notes, Software Release Notes) and a main content area with sections for 'New or Updated Information' (listing 'IMPACC Study Access'), 'Data Submission' (listing 'Overview', 'Decision Tree', 'ImmPort Data Model', 'Guide to Data Upload Templates (PDF)', 'Data Upload Templates Package (ZIP)', 'Example Data Upload Packages', 'Data Package Validator', 'Detailed Template Documentation', 'Submission Templates', 'Study Registration Wizard', 'HIPIC Standards'), 'Developers' (listing 'API Overview' with sub-items 'Authentication API', 'Shared Data API', 'Data Upload API', 'Batch Updater API', 'File Download Tool', 'Design Documentation', 'Data Model Overview'), and 'General Informa' (listing 'About ImmF', 'Publications', 'Newsletters', 'Interactive T', 'Additional T'). A QR code is visible in the bottom right corner of the screenshot. At the bottom of the page, it says 'Please visit the ImmPort Main site or the ImmPort Shared Data site or the ImmPort Private D.'.

Need guidance or more information: [ImmPort\\_Helpdesk@immport.org](mailto:ImmPort_Helpdesk@immport.org)