Unlocking the power of the patient voice with AI

White Swan

White Swan is a Registered Charity (*1176486*)

Social Media Data has the power to save and improve lives.

5bn

use social media globally

80%

use to benefit health

WHITE **SWAN**

The Opportunity:

Harness the power of the patient's voice by leveraging millions of social conversations online using AI to improve health outcomes

Introducing White Swan

- ✓ **Registered charity** with a mission to **improve the health of society**
- ✓ **Proprietary tools and AI**
- ✓ **Published methodology**
- ✓ **Dedicated team of experts**
- ✓ **Providing pioneering insights for our partners**

Patient-centric data-driven insight across the journey

Horizon scanning & identifying unmet needs

Accelerate diagnosis

Clinical trial design & development

Increase treatment adoption & adherence

Improve patient engagement & comms

Inform policy and improve care

Diagnosis → Treatment → Living with Condition

Healthcare Orgs | Researchers | Clinicians & Patients

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Leveraging our Million Minds Insights Platform

Global Reach Accesses an unlimited anonymised dataset, segmented by language, country

Accesses hard-to-reach groups
Such as rare disease patients, at scale

Increased depth & unbiased design
Patients share much more anonymously, are listened to vs asked

Multiple Segmentations Such as condition, co-morbidities, symptoms, treatments, lifestyle and risk factors, outcomes

Agile and Fast
Ability to deep dive into key areas and flex questions/focus.

Integrated clinically validated datasets (Human Phenotype Ontology, Disease Ontology, International classification of diseases, ORPHA.NET)

Proprietary tools and taxonomy Built on White Swan knowledge graph IP, leverages Black Swan algorithms & tech

We access >565k data sources

Patient's Lived Experience

Reddit
430M+ active monthly users

reddit

Boards
500K+ other online forums

mumsnet
by parents for parents

HealthUnlocked

inspire

Reviews
200+ sites

amazon

Walgreens

NHS
(hospital reviews)

Image-led Social
Billions monthly active users*

TikTok

Advocacy, News, & Education

Micro-blogging
600M+ monthly active users*

Blogs
20M+ articles

PHYSICIAN'S WEEKLY

GreenMedinfo
The Science of Natural Healing

PubMed

News
45K+ sites

nature

BioSpace

PHARMIWEB.COM
Global Pharma News & Resources

White Swan

Pillars of Million Minds

Clinical Specialism Datasets

Curated, Cleansed, De-Duped

Entire Clinical Specialisms
Ontology, Cardiology, Rheumatology & Muscular Skeletall, Dermatology....

Specific Clinical Areas
Dementia, Menopause, Parkinson's, Mental Health ....

In Development
Gastroenterology, Immunology, Haematology....

Data Models / NLP

Enriching, Clustering

Taxonomies
Topic Clustering

Named entity recognition
Entity Linking
Relationship extraction

Context Relevance
Author Authenticity

Knowledge Graph

Connecting, Querying

Nodes: entities of interest
E.g. Symptom, Condition, Side Effect....

Properties: Each node has its own set of properties. E.g Label (such as shortness of breath, cross ref's (e.g. SNOWMED code)

Relationships (between nodes): E.g. "Risk factor for", "Side effect of", "Mentioned with"....

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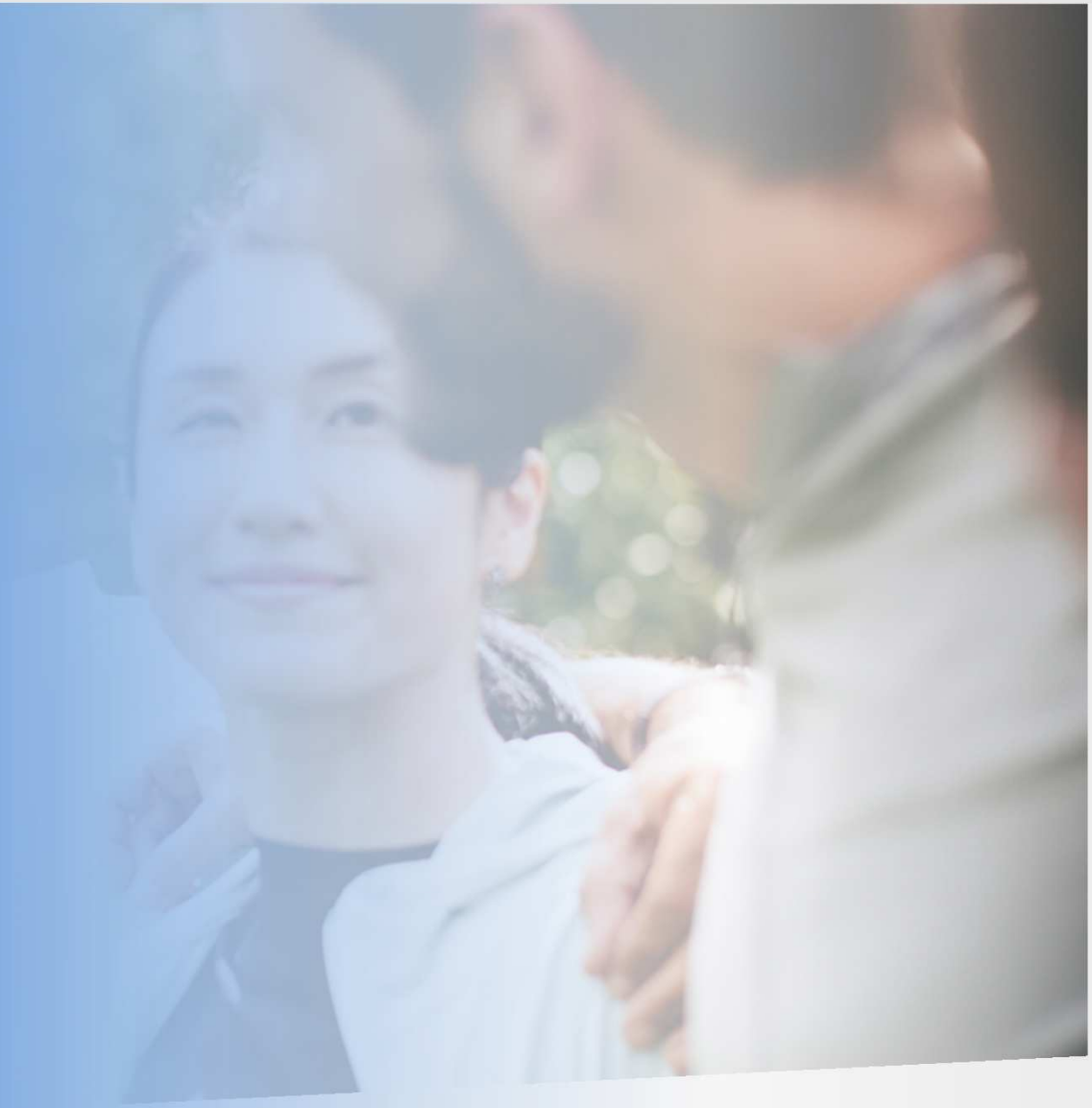
Case Studies

Health Care



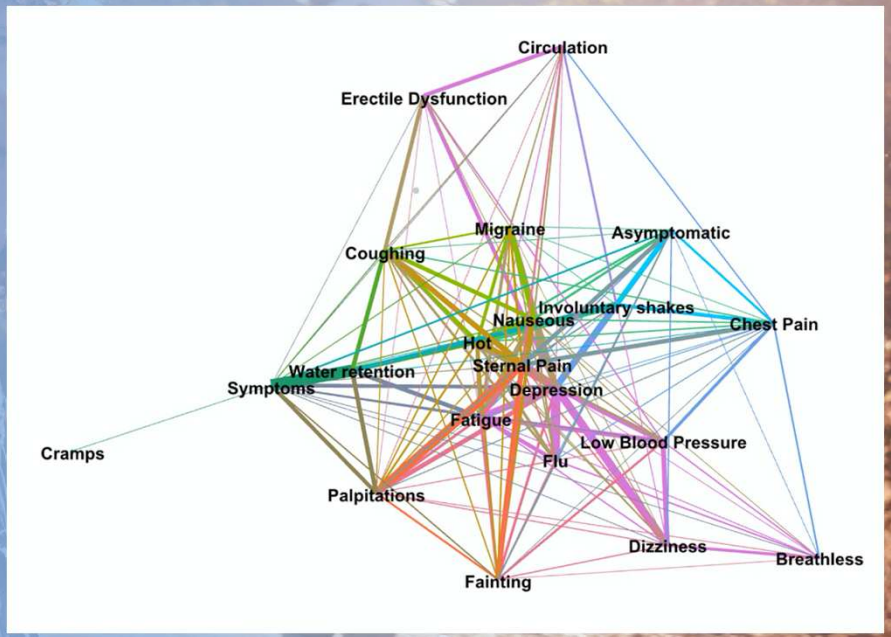
Accelerating Diagnosis in Cardiology

University Hospitals Birmingham
NHS Foundation Trust

Objective
Understand key features of Hypertrophic Cardiomyopathy to accelerate diagnosis and improve effectiveness of disease management

Data Analysis
>18k conversations

Outcome
An innovative quantitative symptom map to support clinical diagnosis. Identified new target group uniquely placed to spot early symptoms to education to accelerate diagnosis.



Case Study

Improving Cancer Care

The ROYAL MARSDEN
NHS Foundation Trust

Objective
Understand opportunities to improve patient experience in Royal Marsden Hospital

Data Analysis
>26k conversations (short and long form)

Outcome
Clear findings and recommendations to inform the Royal Marsden patient care strategy presented, including areas not previously identified through traditional patient surveys.

"We want to be at the forefront of patient care, so I was genuinely excited when I read the report – this has the potential to have a significant positive impact on patient experience at the Royal Marsden"

Chief Nurse, Royal Marsden

Case Study

Improving Clinical Trial Design

Objective

Understand and gain actionable insights from patients on their experience with the condition from diagnosis to enhance clinical trial design.

Data Analysis

>50k datapoints from 50m global documents

Outcome

Robust and actionable insights getting to the ‘why’ behind barriers to current adherence and adoption, to support NICE approval of new treatment innovation.

*We were delighted with the work that White Swan delivered, which helped us gain a **greater understanding of the patient’s needs and inform our clinical trial design.** The insights were robust and actionable and at every stage the team were incredibly responsive, professional and enjoyable to work with.*

Kerry Kriel,
Early Asset Strategist

Case Study

Informing Strategic Priorities

Objective
Understand patient and carer experiences from diagnosis to end of life care to identify their greatest needs to inform and shape development of future charitable services

Data Analysis
>3 million conversations over 3 months

Outcome
Key unmet patient and carer needs identified, including tipping points for support

Alzheimer's Society

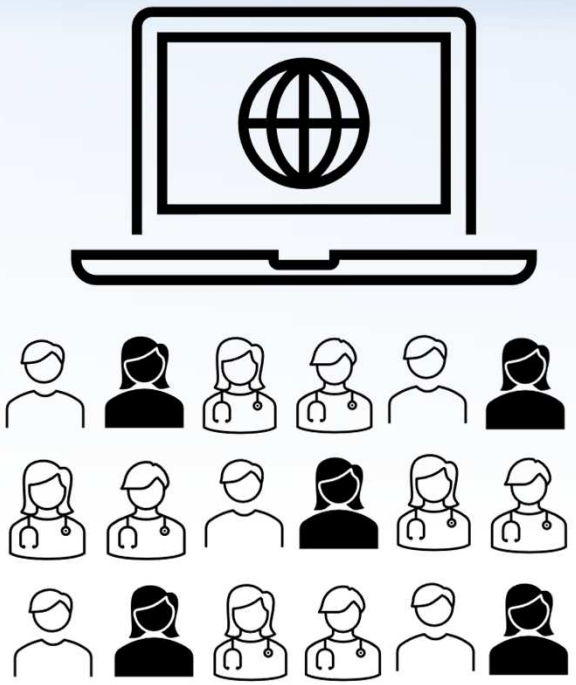
Case Study

Researchers

Creating a Bespoke Interface to Million Minds
(in development)

Unlocking Insight into Real-Life Patient Experiences for Researchers

- **Data democratisation.** Enables access social data a fraction of the cost and time of ingesting, processing, storing and cleaning the data themselves.
- **Discover deep 'whys' behind behaviours** – compliments the 'what' data sources to discover unmet needs, patient priorities, barriers and opportunities.
- **Validated methodology.** We set standards on how to curate and cleanse social data, supported by published papers, to ensure that our novel approach is validated
- **Pre-Proposal Validation & Hypothesis Testing:** Understand data availability and opportunities for analysis
- **Gap analysis:** Understand gaps in existing academic research and how this maps against patient priorities



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Future Innovation

Supporting Clinicians and Patients to Accelerate Diagnosis

The Problem / Opportunity

Millions of people are living undiagnosed, not knowing what is wrong with them or what to do about it.

500
million people
living undiagnosed globally

1 in 17
have a rare disease
at some point in their lives

£3.6bn **NHS cost**
in GP appointments alone for

Long delay
to diagnosis

5.6 **years**

+ 8 **clinicians**

+ 3 **misdiagnosis**

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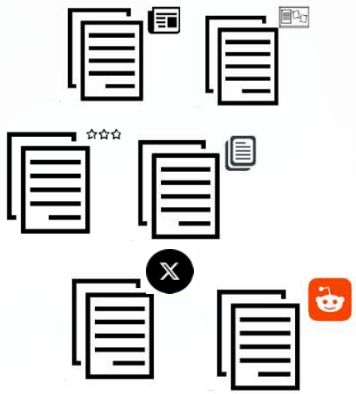
Supporting Accelerated Diagnosis



Online social data

NLP/Models
- named entity recognition
- entity linking
- entity relationship extraction

"social" entities and relationships
- Comorbidities
- Lifestyle factors
- Treatment side-effects
- …

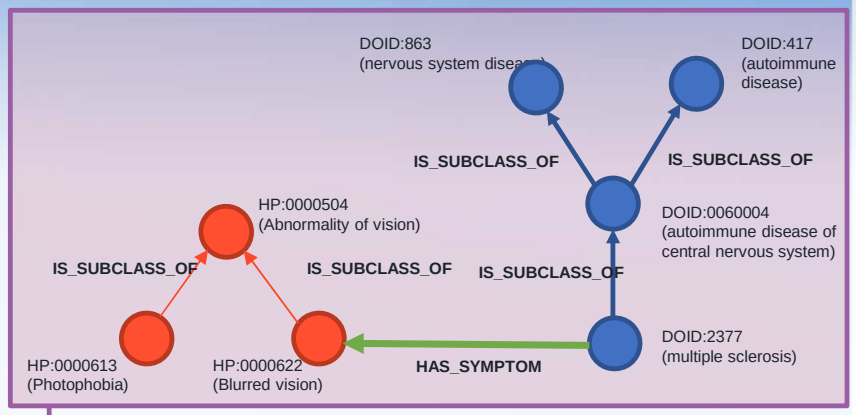
Expert knowledge

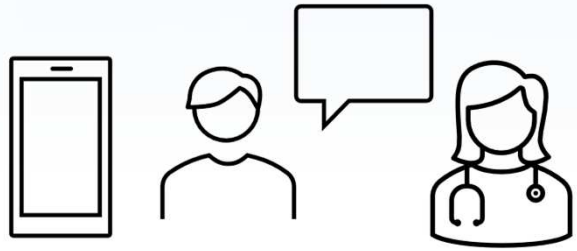
"Symptom" entities based on Human Phenotype Ontology (HPO)

"Condition" entities based on Disease Ontology (DO)

With cross-refs to other ontologies e.g. MeSH, ICD, SNOMED etc

Million Minds Knowledge Graph





Combines collective patient experience to help patients with their clinicians get to a diagnosis faster.

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In Summary

- ✓ Social data offers huge potential to improve health outcomes
- ✓ There is powerful insight accessible across the patient journey to accelerate diagnosis, improve treatment and care
- ✓ LLMs are accelerating our ability to cleanse and analyse
- ✓ Opening-up access to researchers could transform patient-centric advances
- ✓ Future innovation has the potential to support clinicians and patients to accelerate diagnosis

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Thank you
For more information visit
www.whiteswan.org.uk
Or contact me
miranda@whiteswan.org.uk