The Premier Conference for Healthcare Marketers and Digital Leaders

HCIC
HEALTHCARE INTERNET CONFERENCE

November 10-13, 2024

JW Marriott
AUSTIN, TX

UT Southwestern Medical Center

Schema App

Future-Proof Your Organization for AI and Search

Michael Meixner
Director of Digital Engagement
UT Southwestern Medical Center

Martha van Berkel
CEO
Schema App

Martha van Berkel's Knowledge Graph

Schema App is a scalable End-to-End Schema Markup Solution for Enterprise SEO teams.

We help organizations leverage Schema Markup and Content Knowledge Graphs to stand out in search with our industry-leading Schema App platform and High Touch Support services.

Trusted by Enterprises Worldwide

HENRY FORD HEALTH

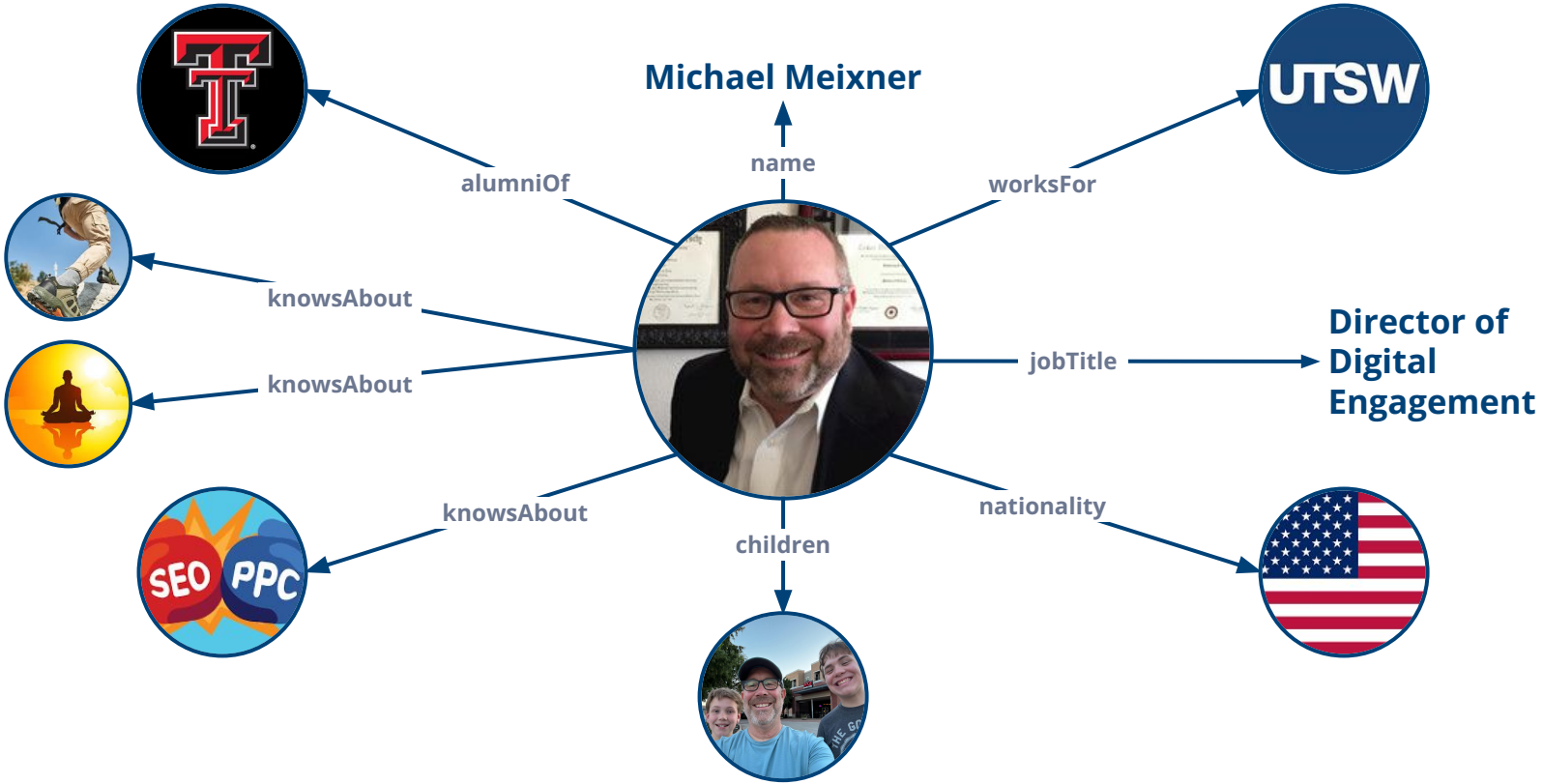
AdventHealth

BAPTIST HEALTH

HOUSTON Methodist LEADING MEDICINE

SHARP

Michael's Knowledge Graph



How “Search” is changing

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Google Search I'm Feeling Lucky

Google offered in: Français

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Search has moved from strings to things

Lexical search → Semantic search

Keywords → Entities and Knowledge Graphs

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Popular AI search engines

From sources across the web

Perplexity AI	You.com	Microsoft Bing
Phind	ANDI	Waldo
YEP	Brave Search	KOMO
Gemini	Google Search	Microsoft Copilot
ChatGPT	DuckDuckGo	NeevaAI

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AI Overview (AIO) prefers specialist sites over generalist sites

Consumer News / General sites
Exposure in AIO

- VerywellHealth.com – 77.9% decline
- EverydayHealth.com – 95.6% decline

Specialized / Authoritative sites
Exposure in AIO

- MayoClinic.org – 32.4% growth
- U.S Dept of Health & Human Service – 83.2% growth

Source: BrightEdge. August Brings Significant Changes in AI Overviews Rollout and Behavior

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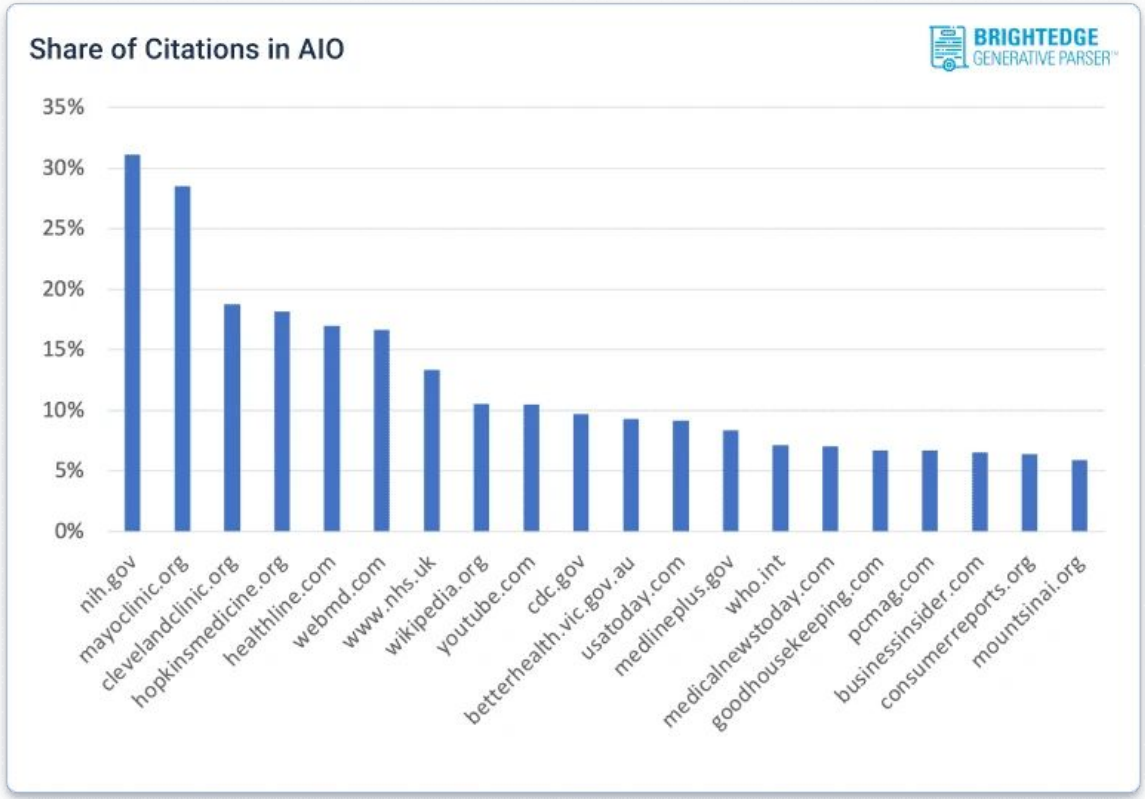
63% of healthcare queries have an AI Overview

- There is **double** the concentration of citations for healthcare sites compared to the average.
- For marketers in healthcare, expect AI Overviews to appear for informational queries.



Source: BrightEdge

AI Overviews & Informational Queries

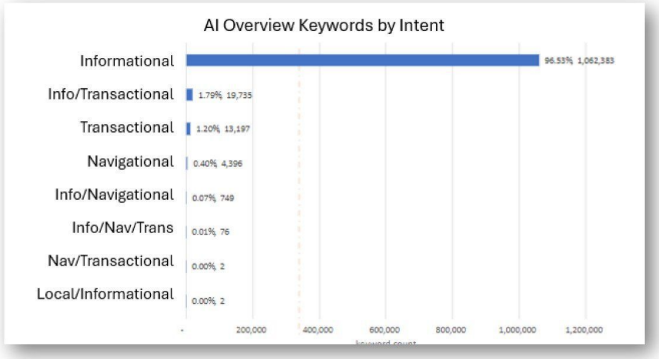
seoClarity released a report indicating that 96% of keywords triggering AIO are *informational*

Recall categories of keyword intent:

- Informational
- Transactional
- Navigational

Optimizing informational content for AIO is critical to strong performance.

96% of AIO Keywords are Informational



seoClarity™

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Sources: Mark Traphagen, Search Engine Roundtable.

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AI Overviews & Well Ranking Sites

Furthermore: in 99.5% of cases, **URLs that appeared in AIO *also* appeared in the Top 10 Results.**

Optimizing for AIO is familiar territory:

- Optimize for Google
- Publish useful content for humans
- Follow best practices
  - Consider Keywords
  - Linking (Internal, Backlinks, Entities)
- Lower site speed & maintain technical quality

Sources: Mark Traphagen

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How we measure success in search is changing

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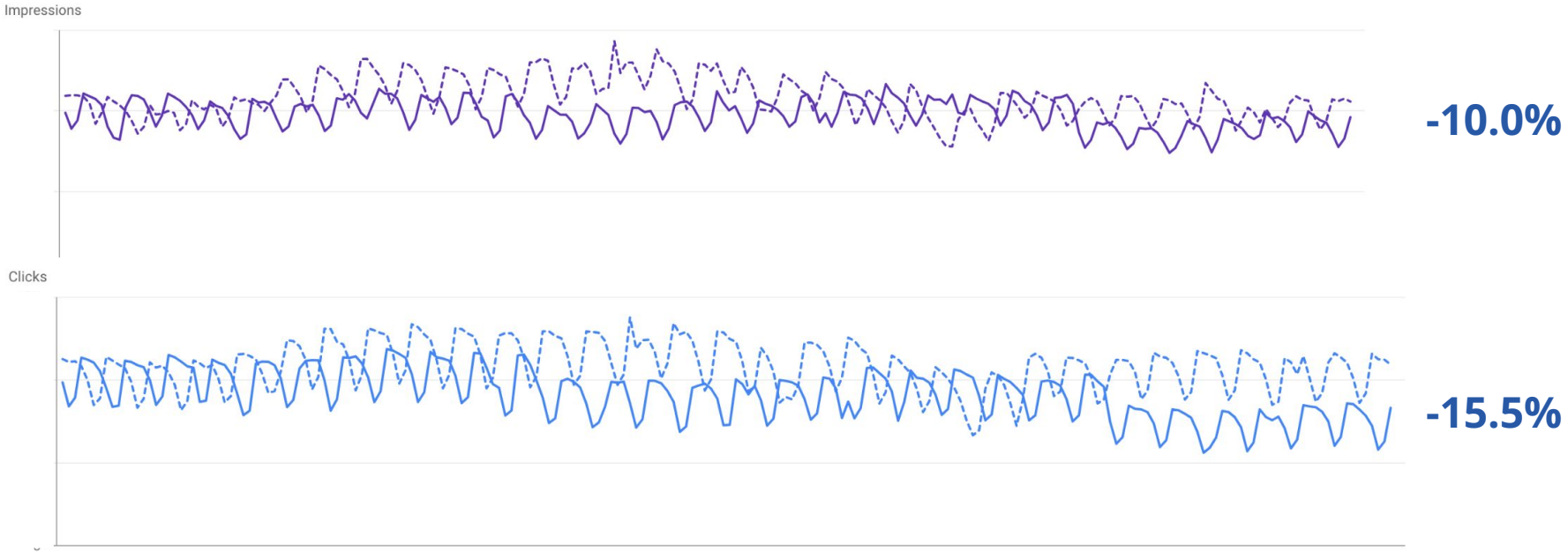
UTSW – Zero click impacts since March 2024

Google Search Console Trends (Mar -Sep 2024 vs previous period)



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UTSW – Zero click impacts since March 2024

Site Impacts (Mar -Sep 2024 vs previous period)

Total users	New users	Returning users	Sessions	Engaged sessions
↓ -16.72%	↓ -17.49%	↓ -32.97%	↓ -18.27%	↓ -20.07%

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Start with Quality, Informative Content

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"Create helpful, reliable, people-first content"
- Google

Helpful Content should include:

- Factual information
- Comprehensive description of the topic
- Additional unique insights or information that other similar pages do not have
- Information that can demonstrate E-E-A-T

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"Create helpful, reliable, people-first content"
- Google

Content should reflect *authority*

- Page must clearly indicate who the author is and link to the author page
- Good to also include author byline to demonstrate author's knowledge in the subject

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< MedBlog

Your Pregnancy Matters

What does it mean to be a carrier for fragile X syndrome?

October 15, 2024

Ashley Zink, M.D.
Obstetrics and Gynecology

Heather Fisher, M.S.
Obstetrics and Gynecology

One of the genetic carrier screenings available to pregnant patients tests for fragile X syndrome, the most common inherited cause of intellectual disability.

Triggered by a mutation in the *FMR1* gene on the X chromosome, fragile X syndrome affects about 1 in 7,000 males and about 1 in 11,000 females. These individuals may have delayed speech and motor skills, hyperactivity, and social and emotional challenges. Fragile X syndrome is also associated with 1%-6% of cases of autism spectrum disorder.

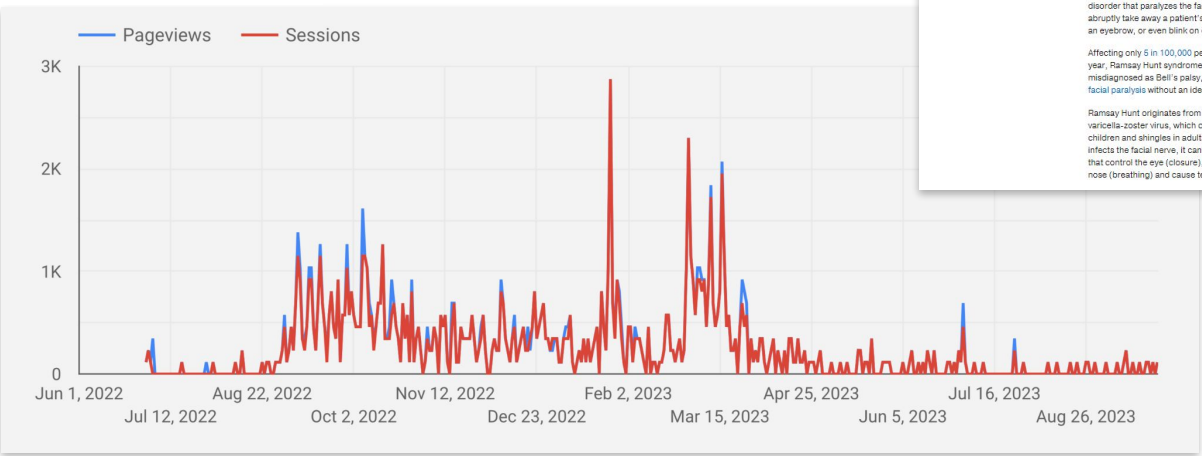
While having fragile X syndrome is not particularly common, **it is far more common to be a carrier** – a person with an altered version of the *FMR1* gene who does not show any symptoms of the syndrome.

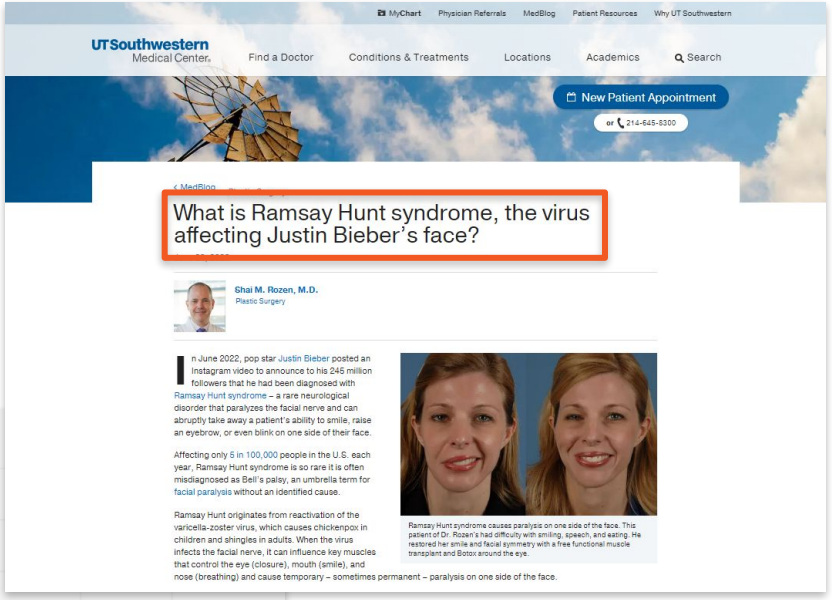
Fragile X syndrome is the most common inherited cause of intellectual disability. Learning about carrier status can help families prepare for and support their child's unique needs.

The Justin Bieber Effect

Pageviews

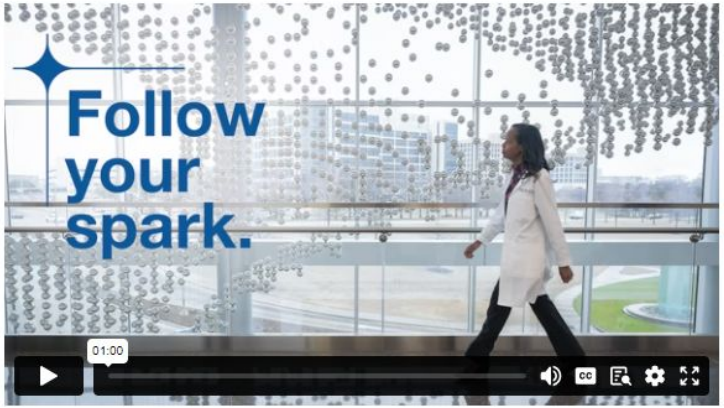
116,449





UTSW – Changes to Video Content

- Updated Vimeo file names and descriptions to be more clear on what they were about.
- Resulted in videos showing up more in search.
- Deployed Schema Markup at scale to provide clarity on what each unique page is describing



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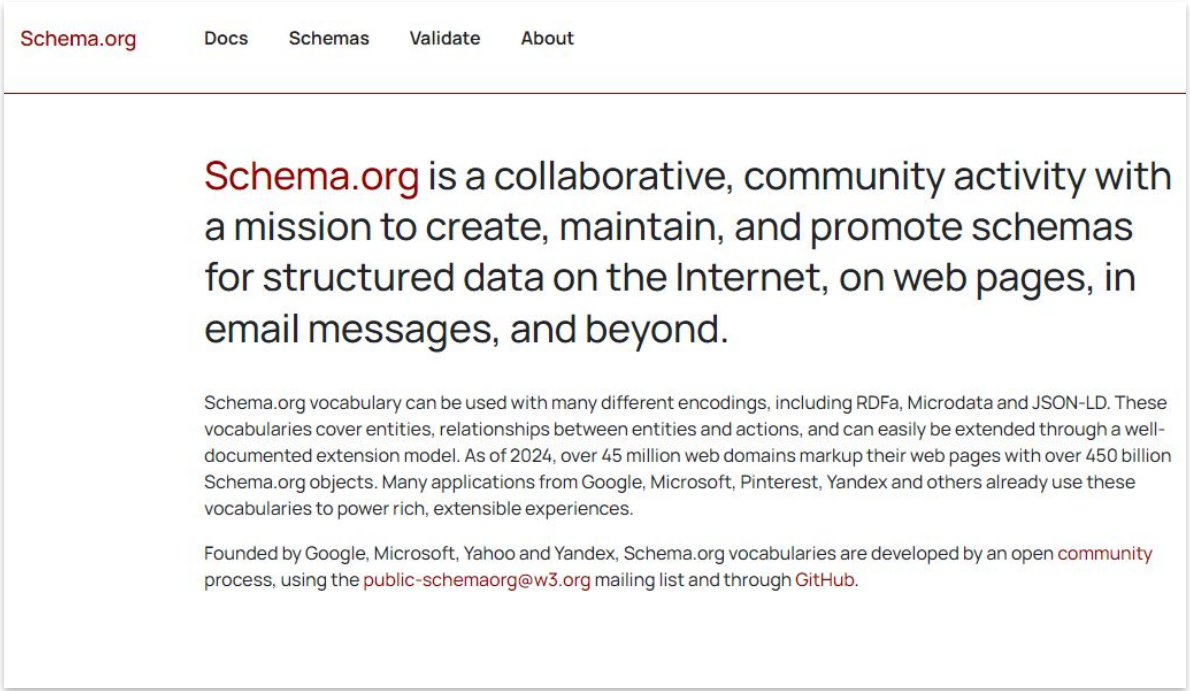
Schema.org

=

Vocabulary used by search engines

=

Information search engines might want to see on your page



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What do search engines want to know about **Medical Conditions**?

MedicalCondition

A Schema.org Type

Thing › MedicalEntity › MedicalCondition

[more...]

Any condition of the human body that affects the normal functioning of a person, whether physically or mentally. Includes diseases, injuries, disabilities, disorders, syndromes, etc.

Property	Expected Type	Description
Properties from MedicalCondition		
associatedAnatomy	AnatomicalStructure or AnatomicalSystem or SuperficialAnatomy	The anatomy of the underlying organ system or structures associated with this entity.
differentialDiagnosis	DDxElement	One of a set of differential diagnoses for the condition. Specifically, a closely-related or competing diagnosis typically considered later in the cognitive process whereby this medical condition is distinguished from others most likely responsible for a similar collection of signs and symptoms to reach the most parsimonious diagnosis or diagnoses in a patient.
drug	Drug	Specifying a drug or medicine used in a medication procedure.
epidemiology	Text	The characteristics of associated patients, such as age, gender, race etc.
expectedPrognosis	Text	The likely outcome in either the short term or long term of the medical condition.
naturalProgression	Text	The expected progression of the condition if it is not treated and allowed to progress naturally.
pathophysiology	Text	Changes in the normal mechanical, physical, and biochemical functions that are associated with this activity or condition.
possibleComplication	Text	A possible unexpected and unfavorable evolution of a medical condition. Complications may include worsening of the signs or symptoms of the disease, extension of the condition to other organ systems, etc.
possibleTreatment	MedicalTherapy	A possible treatment to address this condition, sign or symptom.
primaryPrevention	MedicalTherapy	A preventative therapy used to prevent an initial occurrence of the medical condition, such as vaccination.
riskFactor	MedicalRiskFactor	A modifiable or non-modifiable factor that increases the risk of a patient contracting this condition, e.g. age, coexisting condition.
secondaryPrevention	MedicalTherapy	A preventative therapy used to prevent reoccurrence of the medical condition after an initial episode of the condition.
signOrSymptom	MedicalSignOrSymptom	A sign or symptom of this condition. Signs are objective or physically observable manifestations of the medical condition while symptoms are the subjective experience of the medical condition.
stage	MedicalConditionStage	The stage of the condition, if applicable.
status	EventStatusType or MedicalStudyStatus or Text	The status of the study (enumerated).
typicalTest	MedicalTest	A medical test typically performed given this condition.

Make your Content Easy to Understand for Machines

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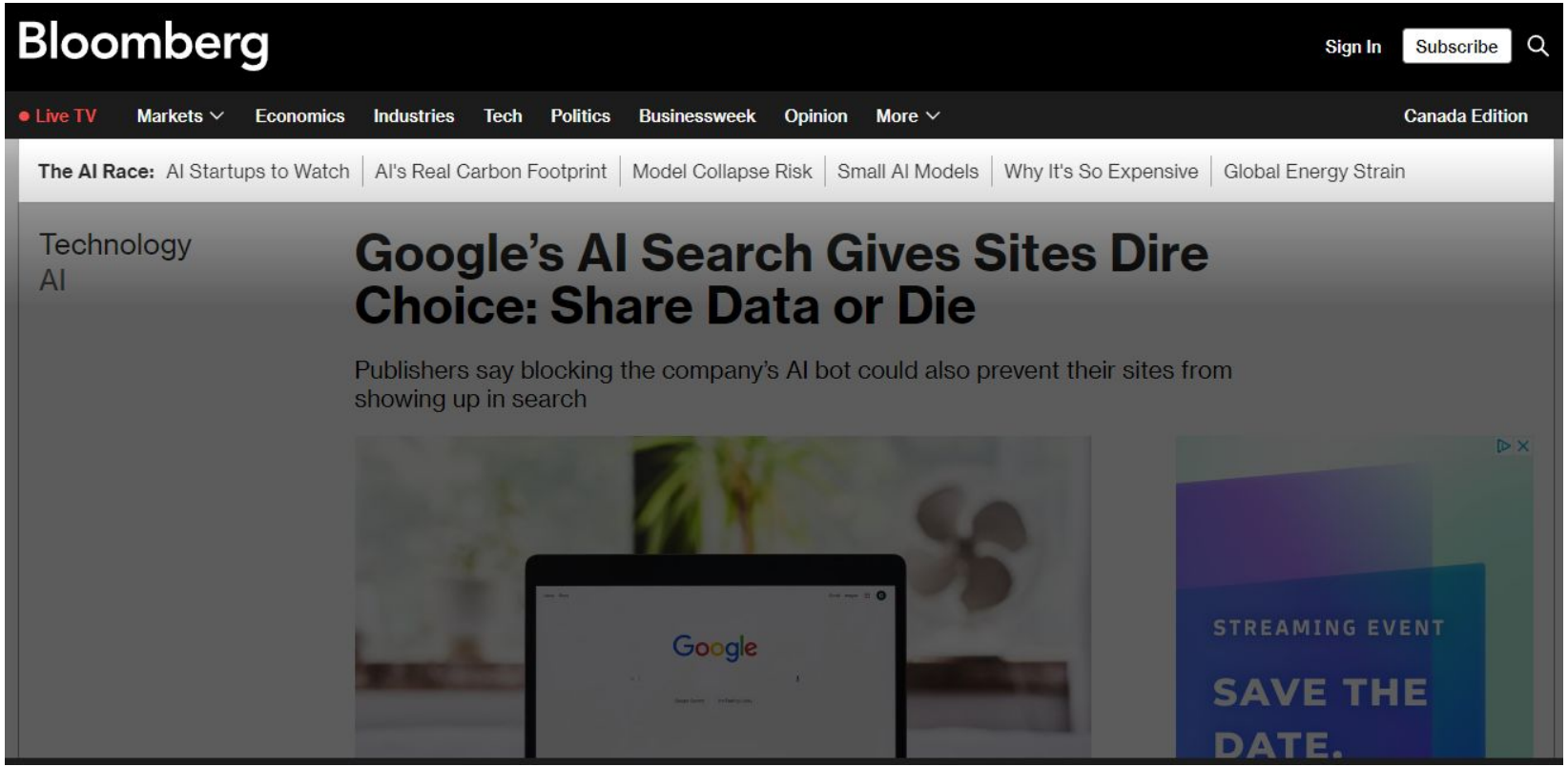

Source: https://www.bloomberg.com/news/articles/2024-08-15/google-s-search-dominance-leaves-sites-little-choice-on-ai-scraping

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What is Schema Markup?

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- Data you add to your website to:
  - Help search engines better understand your content and entities
  - Provide users with better search results
- Also known as Structured Data
- Uses Schema.org standard vocabulary to define entities on your site
- Helps organizations achieve rich results on the SERP

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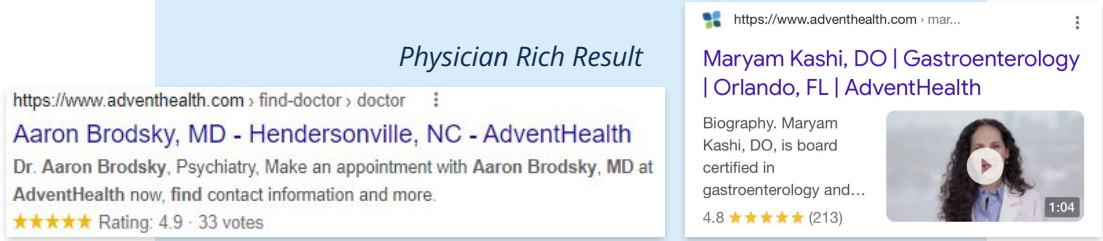
Schema Markup helps search engines understand the content on your site

```
<script type="application/ld+json">
{
 "@context": "https://schema.org",
 "@type": "Hospital",
 "@id": "https://utswmed.org/#Hospital",
 "url": "https://utswmed.org/",
 "name": "UT Southwestern Medical Center",
 "alternateName": "UTSW",
 "slogan": "The future of medicine, today.",
 "description": "UT Southwestern Medical Center in Dallas is one of the top
academic medical centers, delivering compassionate care and the latest medical
advances to patients.",
 "telephone": "+12146483111",
 "award": "#1 Best Regional Hospitals in Dallas-Forth Worth Metro",
 "areaServed": "http://www.wikidata.org/entity/Q16557",
 "telephone": "+18554448624",
 "sameAs": "https://twitter.com/UTSWMedCenter",
 "sameAs": "https://www.youtube.com/user/UTSWMed",
 "sameAs": "https://www.facebook.com/utswmed",
 "address": {
    "@type": "PostalAddress",
    "name": "UT Southwestern Medical Center Address",
    "@id": "https://utswmed.org/#PostalAddress",
    "streetAddress": "5323 Harry Hines Blvd.",
    "postalCode": "75390",
    "addressRegion": "TX",
    "addressLocality": "Dallas",
    "addressCountry": "US",
     },
}
</script>
```

Stand Out In Search with Rich Results

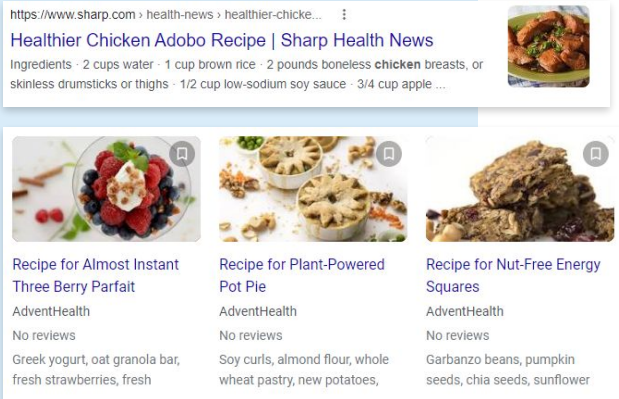
Physician Rich Result



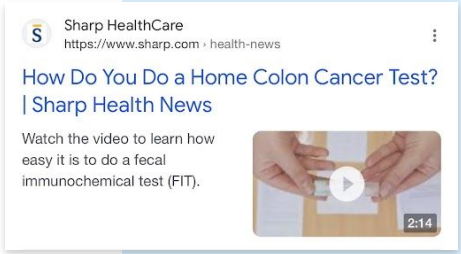
Job Listing

Review Snippet on Location Page

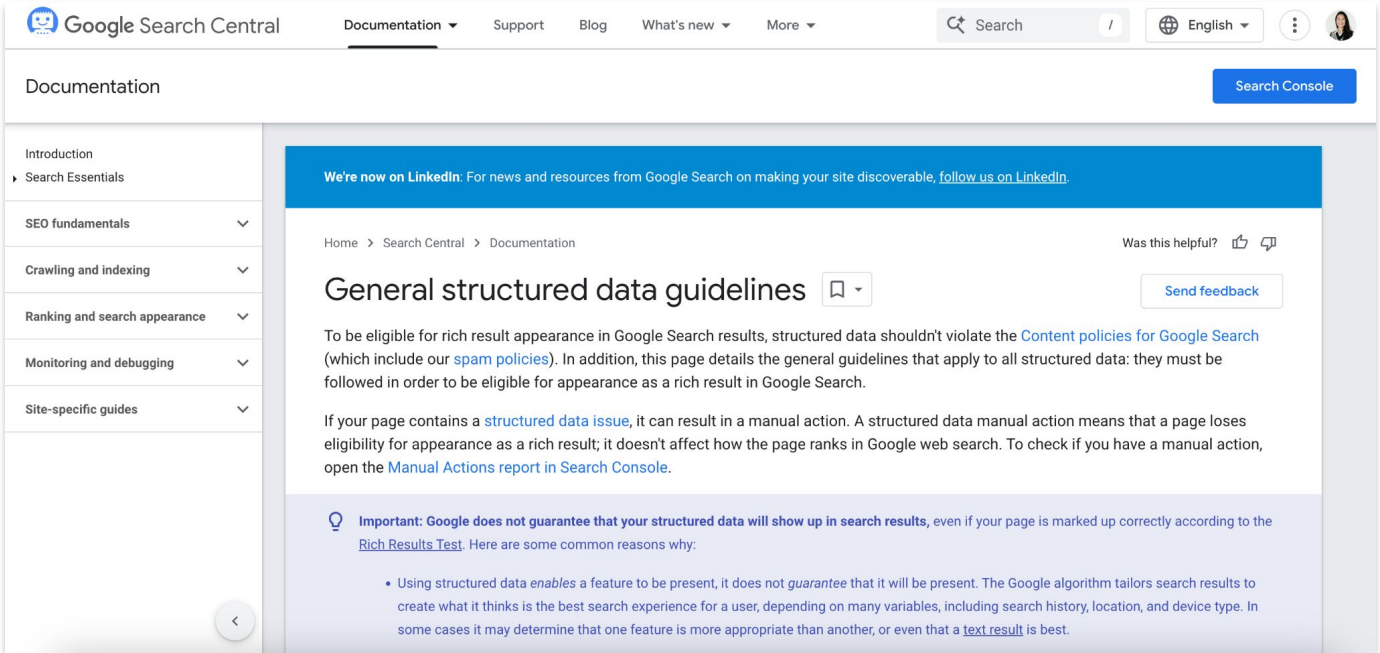
Recipe Rich Result



Video Rich Result



If you want achieve rich results, your content and website has to align with Google's Structured Data Guidelines at all times



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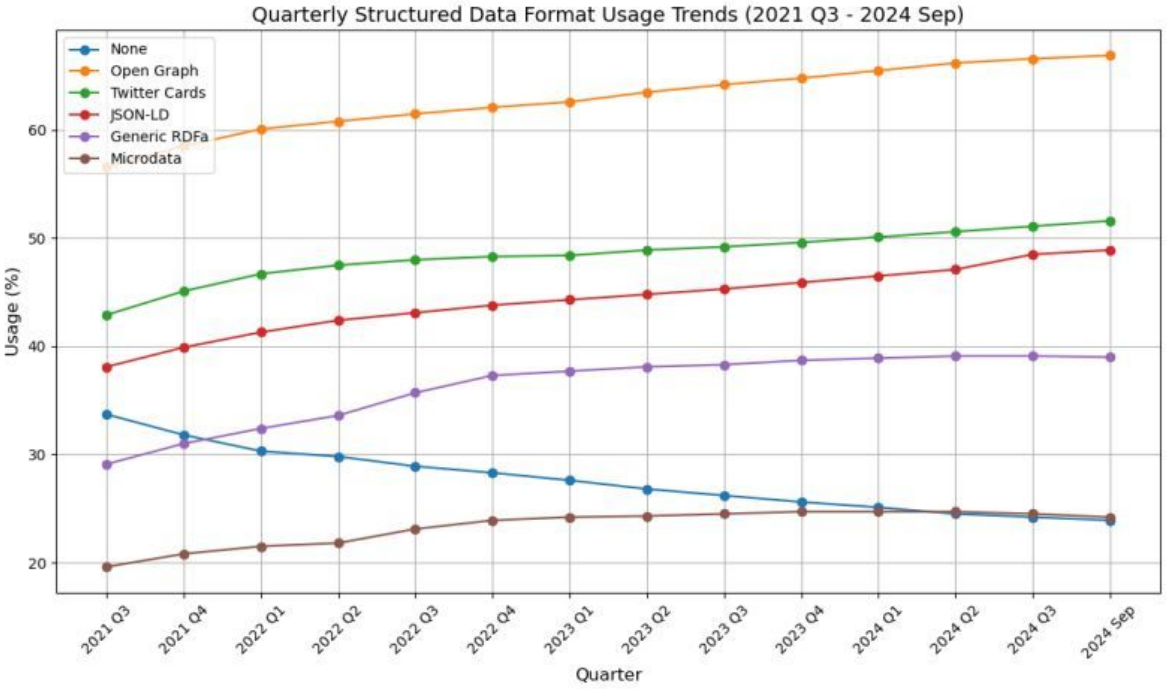
~50% of websites are using Structured Data

Structured data will play an increasingly critical role in the continued growth of AI and Voice search.



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Understanding and Disambiguation

October 2023

Structured Data is “machine readable data that search engines can use to **understand the content".**

New Types will be introduced and some might go away. – How-To and FAQs deprecated

Google introduced 5 new rich results

Aug 2024

Google updated Organization structured data documentation to emphasize that

- Organization **markup *disambiguates*** one organization from others using properties like iso6523 and naics.
- Certain properties can influence visual elements in search results and in a knowledge panel.

Structured Data for Rich Results

Structured Data for Semantics & Disambiguation

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Evolving Value of Schema Markup

Increased CTR from **Rich Results**

AI understanding in Search and AI from knowledge graph

Accelerating Insights from **Content Knowledge Graphs**

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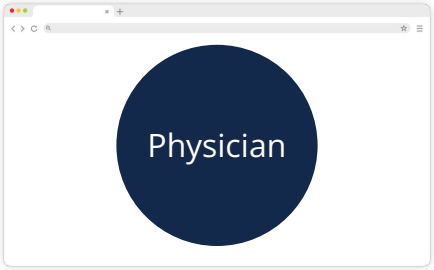
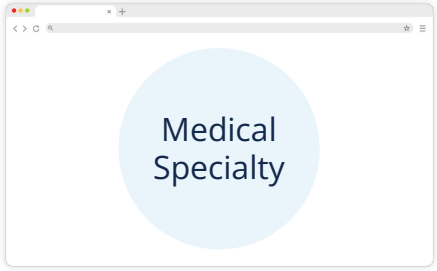
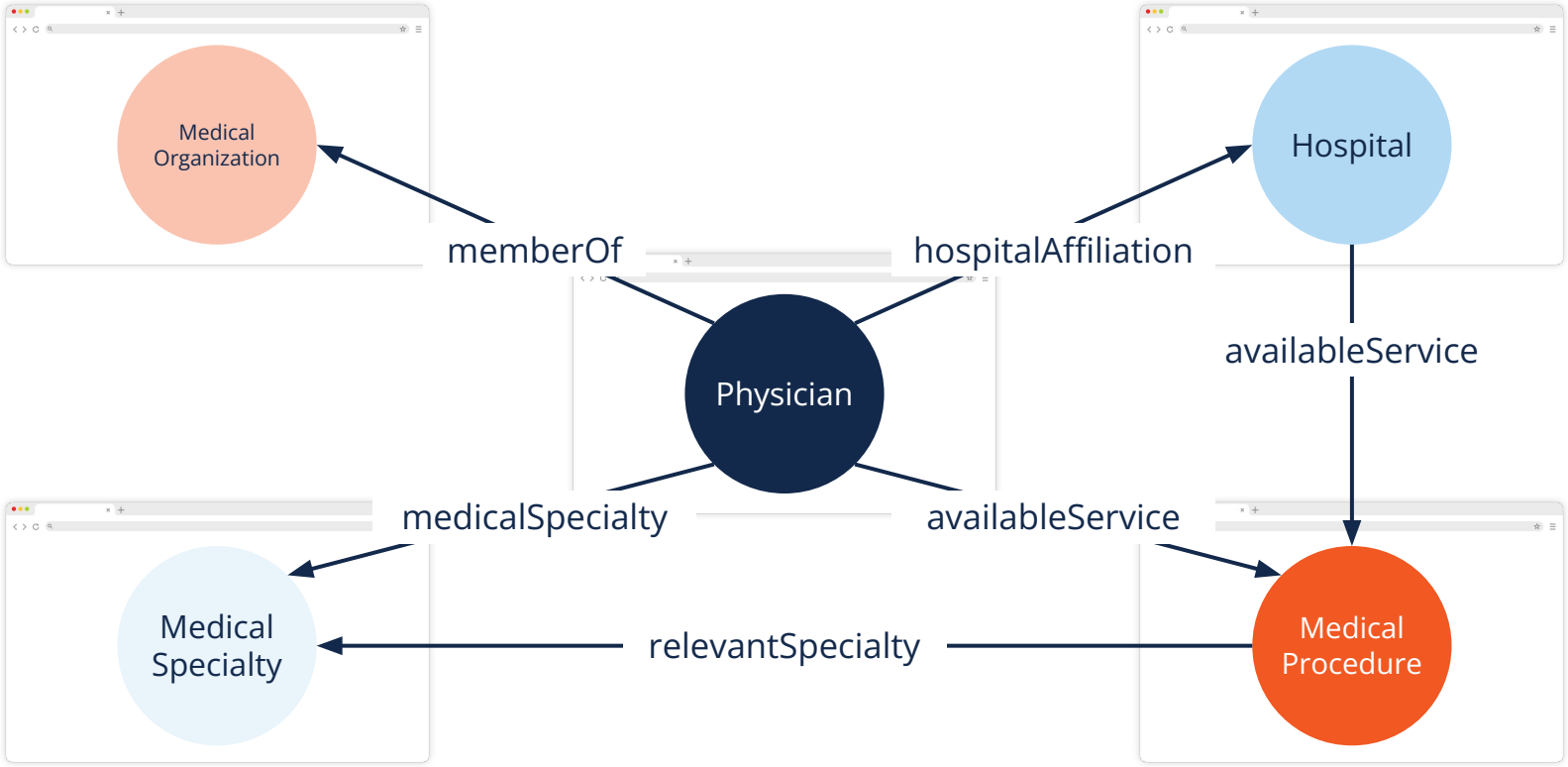
Medical
Organization

Hospital

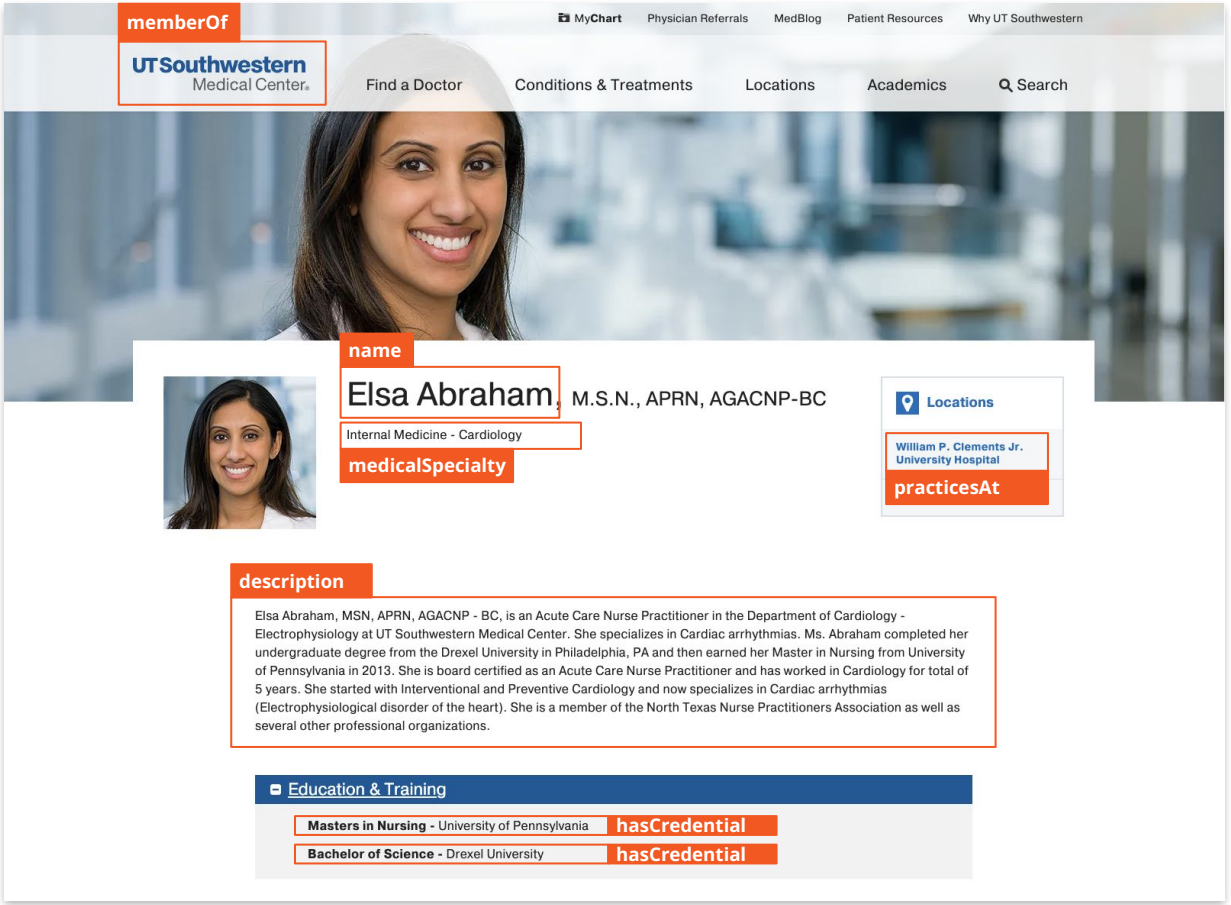

Physician


Medical
Specialty

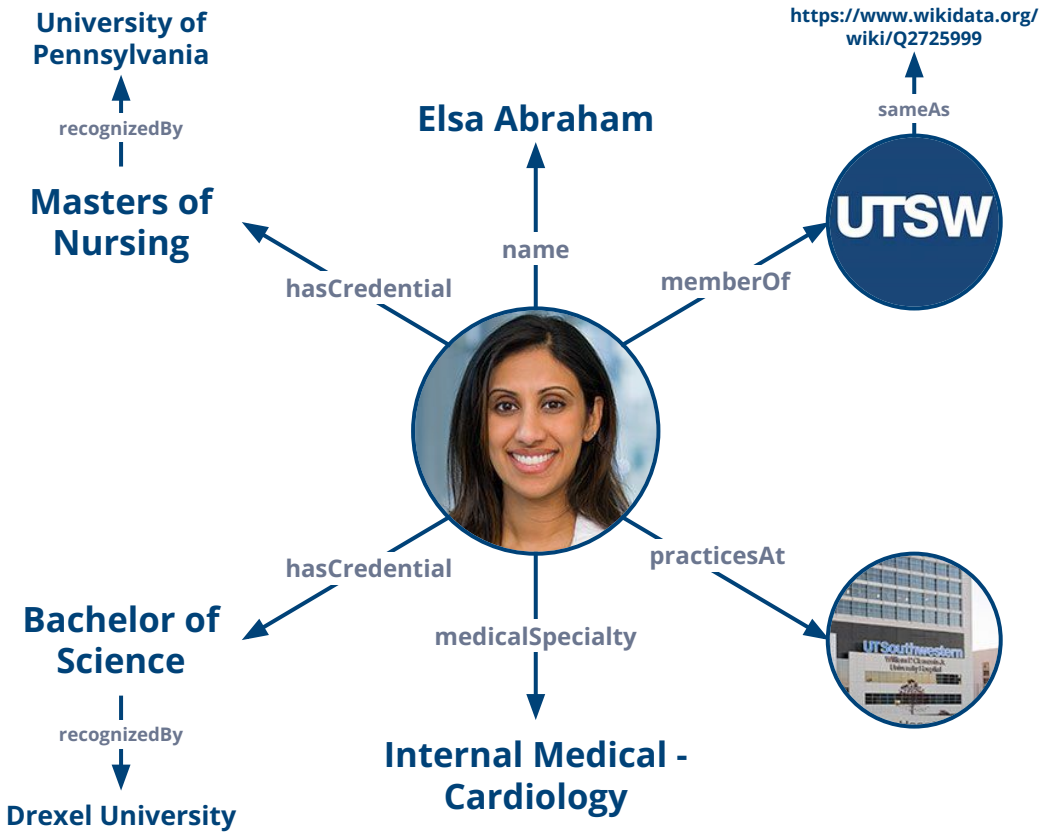
Medical
Procedure


Medical Organization
memberOf
Hospital
hospitalAffiliation
availableService
Physician
medicalSpecialty
availableService
Medical Specialty
relevantSpecialty
Medical Procedure

Schema.org properties used to describe the content on the page and its relationship to other things on the page/the website



Schema Markup builds a Content Knowledge Graph



Entity Linking Supports Search Engine Disambiguation

medicalSpecialty

Internal Medical - Cardiology

sameAs

https://www.wikidata.org/wiki/Q10379

kg:/m/01nd8

https://en.wikipedia.org/wiki/Cardiology

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What is a Content Knowledge Graph?

A collection of relationships between the ***entities defined within the content on your website*** using a standardized vocabulary, from which new knowledge can be gained through inferencing.

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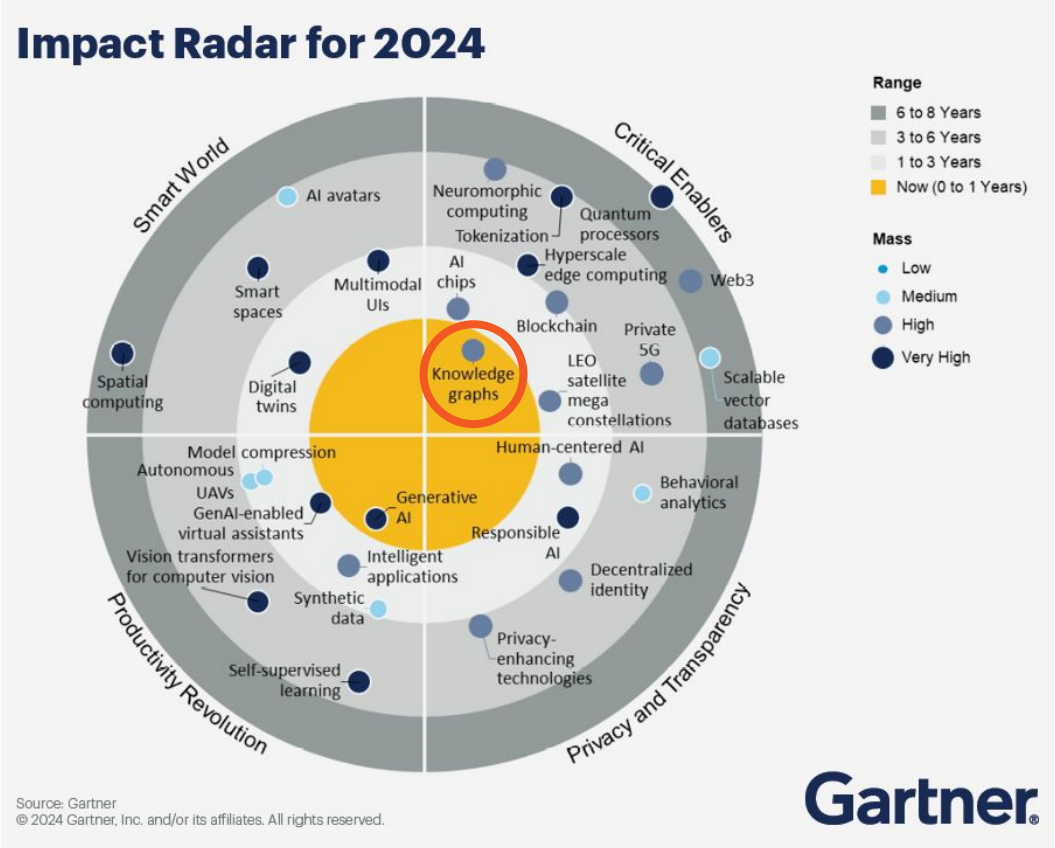
Gartner names **Knowledge Graphs** as a "Critical Enabler" technology

[Gartner: 30 Emerging Technologies That Will Guide Your Business Decisions (Feb 12, 2024)]



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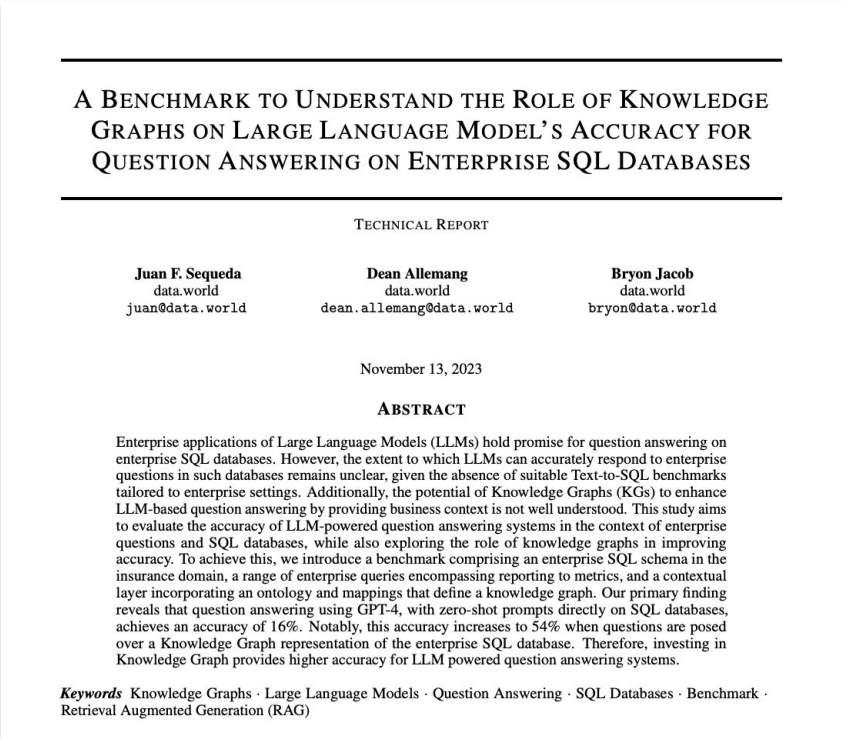
Data.world: Knowledge Graphs provide Higher Accuracy for LLM Responses in Enterprises by 300%

"If enterprises want to achieve higher accurate result in an LLM powered question answering system, they must ***treat the business context and semantics as a first class citizen*** and ***invest in a data catalog platform with a knowledge graph architecture.***"



A BENCHMARK TO UNDERSTAND THE ROLE OF KNOWLEDGE GRAPHS ON LARGE LANGUAGE MODEL'S ACCURACY FOR QUESTION ANSWERING ON ENTERPRISE SQL DATABASES

TECHNICAL REPORT

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November 13, 2023

ABSTRACT

Enterprise applications of Large Language Models (LLMs) hold promise for question answering on enterprise SQL databases. However, the extent to which LLMs can accurately respond to enterprise questions in such databases remains unclear, given the absence of suitable Text-to-SQL benchmarks tailored to enterprise settings. Additionally, the potential of Knowledge Graphs (KGs) to enhance LLM-based question answering by providing business context is not well understood. This study aims to evaluate the accuracy of LLM-powered question answering systems in the context of enterprise questions and SQL databases, while also exploring the role of knowledge graphs in improving accuracy. To achieve this, we introduce a benchmark comprising an enterprise SQL schema in the insurance domain, a range of enterprise queries encompassing reporting to metrics, and a contextual layer incorporating an ontology and mappings that define a knowledge graph. Our primary finding reveals that question answering using GPT-4, with zero-shot prompts directly on SQL databases, achieves an accuracy of 16%. Notably, this accuracy increases to 54% when questions are posed over a Knowledge Graph representation of the enterprise SQL database. Therefore, investing in Knowledge Graph provides higher accuracy for LLM powered question answering systems.

Keywords Knowledge Graphs · Large Language Models · Question Answering · SQL Databases · Benchmark · Retrieval Augmented Generation (RAG)

Source: data.world. (2023, November 13). A Benchmark to Understand the Role of Knowledge Graphs on Large Language Model Accuracy

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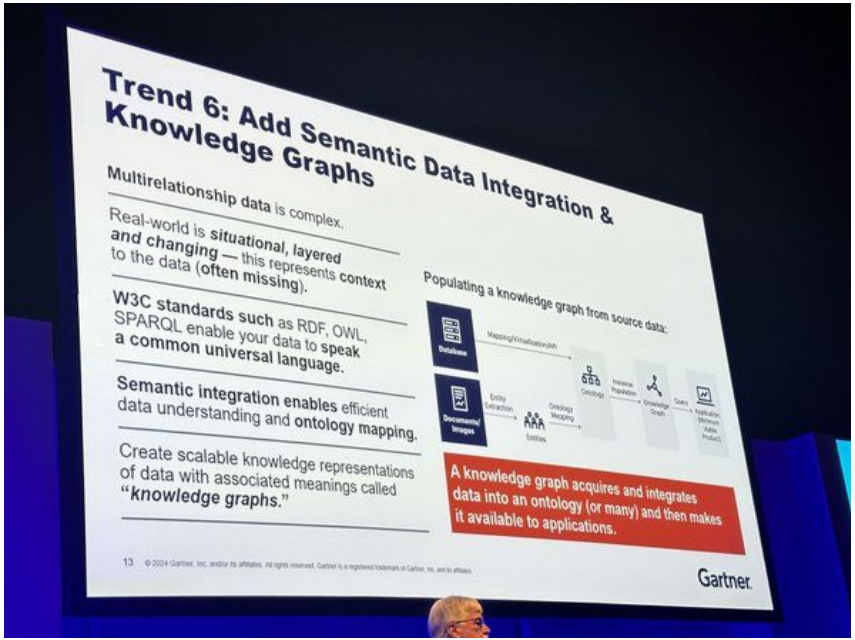
#6 Trend in Data Integration & Engineering: **Knowledge Graphs**

- Schema Markup is powerful tool for SEO but has additional applications.
- Knowledge Graphs that follow W3C standards enable you to re-use and contextualize data in new and useful ways.



Source: Sequeda, Juan. (2024, May 14) https://x.com/juansequeda/status/1790341829683970193

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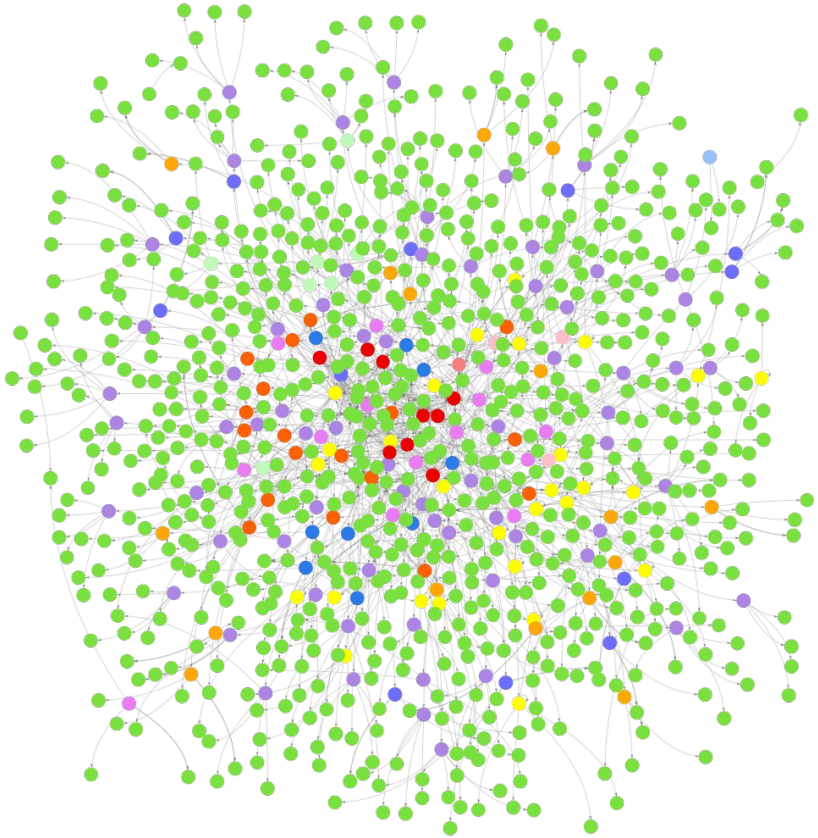
You get a content knowledge graph that is reusable for insights



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Knowledge Graphs can answer these questions...

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Content Inventory

- What exists on my website?
- How widely is a specific entity covered across the website's content?

Content Coverage

- How much existing content overlaps with desired topics?
- Which entities are underrepresented, and where can additional content be created to improve coverage?

Content Optimization

- What new content should be added?
- What existing content should be improved?

Measure Performance

- How has this optimization impacted the performance of my content?

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How do I know if my Schema Markup is Building a Content Knowledge Graph?

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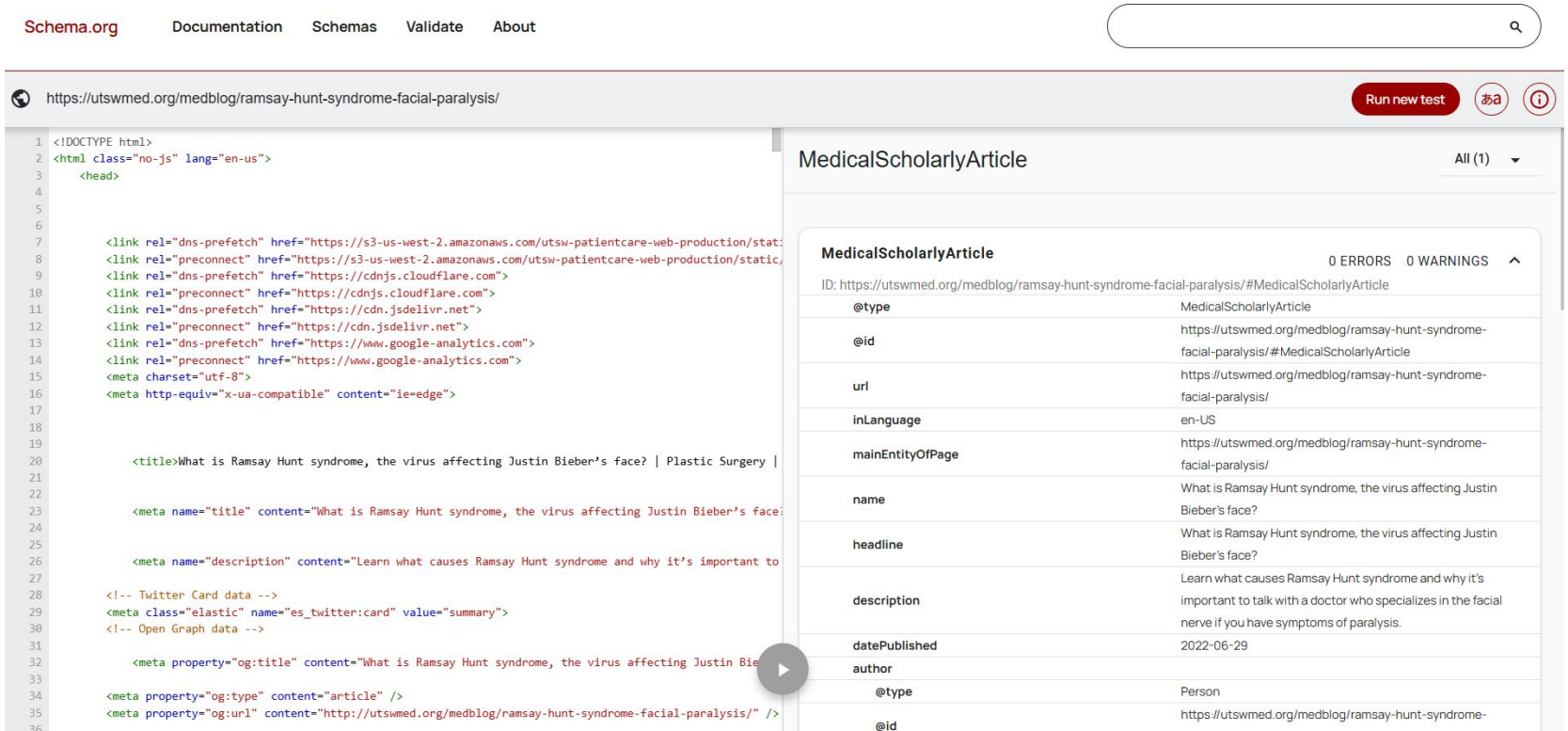
How to test your page for Schema Markup using Schema.org Validator



1. Your Schema Markup is **Nested**

Explains the *hierarchy* and *relationship* between the entities on your page

Nested Schema Markup

```
<script type="application/ld+json">
 [{
  "@context": "https://schema.org/",
  "@type": "Product",
  "name": "White Tshirt",
  "description": "Soft, cotton white Ts."
  "aggregateRating": {
     "@type": "AggregateRating",
     "bestRating": “100”,
     "ratingCount": “70”,
     "ratingValue": “81”,
   }
 }]
```

Unnested Schema Markup

```
<script type="application/ld+json">
 [{
  "@context": "https://schema.org/",
  "@type": "Product",
  "name": "White Tshirt",
  "description": "Soft, cotton white Ts."
   },
   {
  "@context": "https://schema.org",
  "@type": "AggregateRating",
  "bestRating": “100”,
  "ratingCount": “70”,
  "ratingValue": “81”,
   }]
```

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You use the appropriate properties to **connect the entities across your site**

1. Pick the property that best describes the relationship between both entities
2. Include the @id of the entity you want to connect to using the chosen property

```
<script type="application/ld+json">
 [{
 "@context": "https://schema.org/",
 "@type": "BlogPosting",
 "@id": "What is Schema Markup?",
 "headline": "What is Schema Markup?",
 "url": "https://www.schemaapp.com/schema-markup/what
-is-schema-markup/#BlogPosting",
 "datePublished": "2024-05-02T05:48:56+00:00",
 "publisher": {
   "@type": "Organization",
   "@id": “https://schemaapp.com/#Organization”,
    "url":"https://www.schemaapp.com/"
   "name": “Schema App”,
   }
 }]
```

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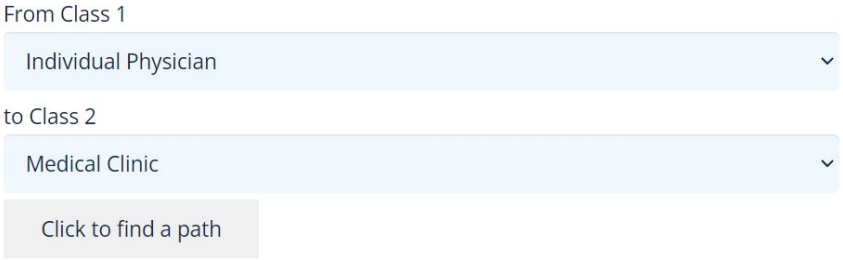
Schema Paths Tool

- Helps users determine how to connect two schema.org types by listing all possible schema.org properties that can connect both types
- Good for connecting content across your pages
- https://www.schemaapp.com/schema-paths/

1. Select two Schema Types you want to connect

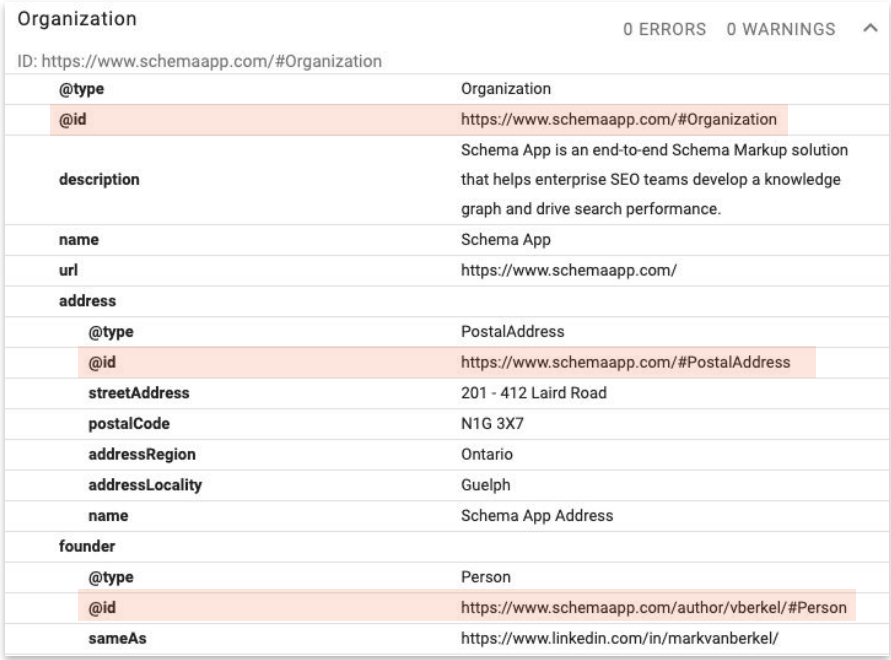


2. See all possible paths

Schema App

2. Your Schema Markup includes **Uniform Resource Identifiers (URIs)**

- For your entity to be *identifiable* and *retrievable*, it must have a distinct URI so that machines and search engines can:
  - Identify the unique entities on your site and
  - Know which entities you are referring to when you connect your entities in your knowledge graph
- In JSON-LD, URIs are expressed with the '@id' attribute



Schema App

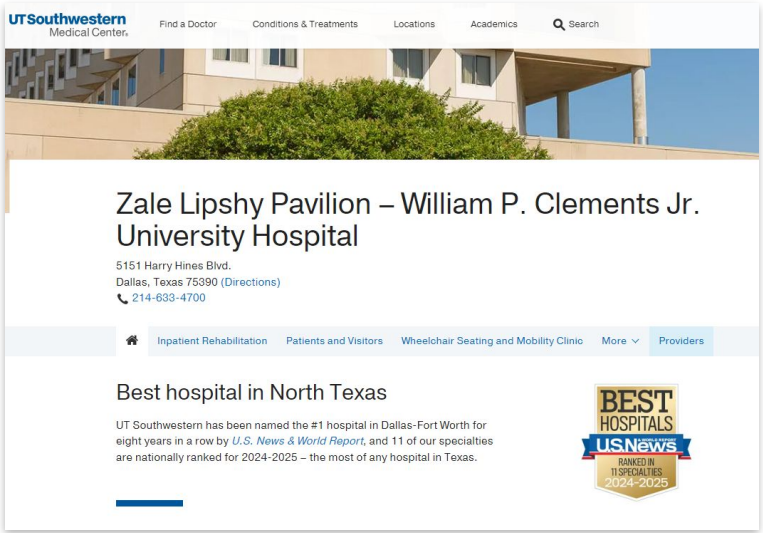
3. You do **Entity Linking** using your Schema Markup

- Identify entities mentioned in the text on your website and link them to the corresponding known entities on external authoritative knowledge bases such as Wikipedia, Wikidata, and Google's Knowledge Graph.
- Can help machines to disambiguate the entity mentioned in your content

```
<script type="application/ld+json">
 [{
 "@context": "https://schema.org/",
 "@type": "BlogPosting",
 "@id": "https://www.schemaapp.com/schema-markup/what
-is-schema-markup/#BlogPosting",
 "headline": "What is Schema Markup?",
 "url": "https://www.schemaapp.com/schema-markup/what
-is-schema-markup/",
 "datePublished": "2024-05-02T05:48:56+00:00",
 "publisher": {
   "@type": "Organization",
   "@id": "https://schemaapp.com/#Organization",
   "name": "Schema App",
 "mentions": {
   "@type": "Thing",
   "name": "Structured Data",
   "sameAs": "kg:/m/05p2j70",
   "sameAs": "http://www.wikidata.org/entity/Q26813700",
   "sameAs": "https://en.wikipedia.org/wiki/Structured_data",
   "alternateName": "Schema Markup",
   }
 }]
```

Schema for Local SEO

- Identified each unique Physician's location and their medical specialty
- Identifies each unique Medical Clinics' location and provides disambiguation about these places through entity linking



areaServed	
@type	Place
@id	https://utswmed.org/locations/zale-lipshy-pavilion/zale-lipshy-pavilion/#MedicalOrganization_areaServed_Place
name	Dallas
sameAs	https://en.wikipedia.org/wiki/Dallas
sameAs	kg:/m/0f2rq
sameAs	https://www.wikidata.org/entity/Q16557

4. You're using a glossary to **define the terms** on your website

- Use Schema Markup to manage and disambiguate terms on your site
- A form of controlled vocabulary

```
<script type="application/ld+json">
[{
  "@context": "https://schema.org/",
  "@type": "DefinedTerm",
  "@id": "https://www.schemaapp.com/glossary/Entity/#DefinedTerm",
  "name": "Entity",
  "url": "https://www.schemaapp.com/glossary/Entity/",
  "disambiguatingDescription": "A thing or concept that is unique and distinguishable, with specific and well-defined attributes. An entity can also described as a Data Item, a Resource, a Node, or a Thing.",
}]
```

UT Southwestern Medical Center

Schema App

Questions?

Thanks for joining us!

Scan the QR code to download our Definitive Guide to Healthcare Structured Data in SEO

Link: https://bit.ly/hcic-2024

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