

DON'T STOP INNOVATING

Hans Constandt

Founder & CEO

Ontoforce

**In4care @ EAHM
September, 13 - 2019**

The ONTOFORCE Journey in 4 minutes

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September, 13 - 2019



2011: How it All Started
FFF - Social Non-
Profit

2013: 1st Pivot to Patients

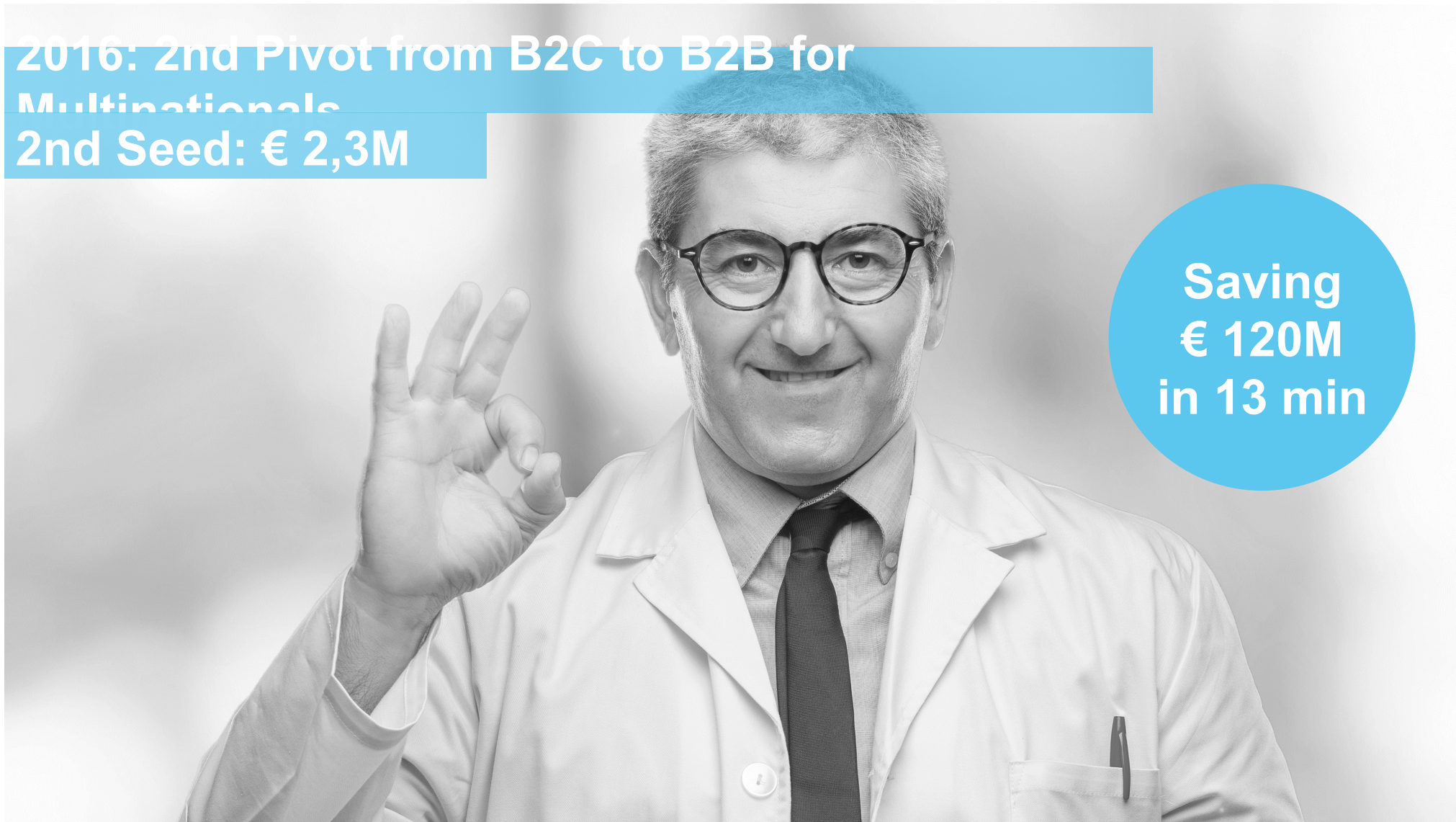
Worldwide
Seed: € 1,1M

Saving
Patient
S
No
Revenue

2016: 2nd Pivot from B2C to B2B for
Multinationals

2nd Seed: € 2,3M

Saving
€ 120M
in 13 min



2018: Intelligent Data EcoSystem Enabling AI

Round A: € 4,3M



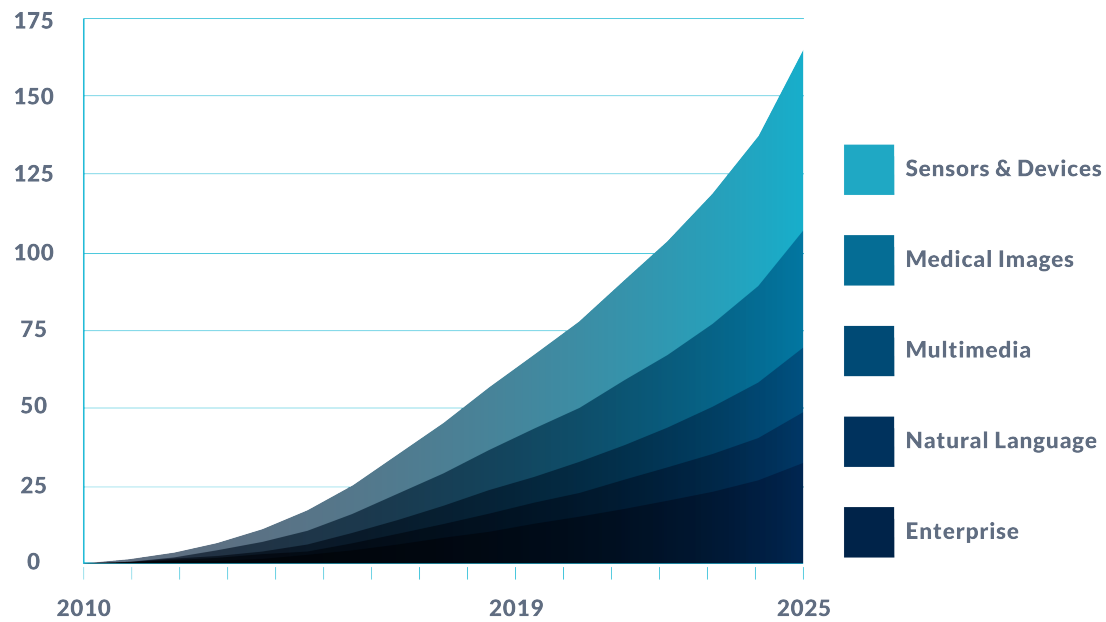
The Problem



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The Data Tsunami

165 ZETTABYTES BY 2025



Source - IDC

Prefix	Size
Kilo	10^3
Mega	10^6
Giga	10^9
Tera	10^{12}
Peta	10^{15}
Eta	10^{18}
Zeta	10^{21}
Yota	10^{24}

disease (dī-zēz') n

A pathological condition of a body part, an organ, or a system resulting from various causes, such as infection, genetic defect, or environmental stress, and characterized by an identifiable group of signs or symptoms



10³⁴ diseases possible in modern *homo sapiens*

100,000 might be realistic estimate

30,000 known diseases

No effective treatments for $\sim\frac{3}{4}$ of the diseases known today worldwide (WHO)

Of these known diseases, **6-8,000** are “rare diseases”

New rare diseases: **~20 per month (5/wk)**

Over **150** can be classified as “**diseases of civilisation**”, including: angina, anxiety, asthma, allergies, bronchitis, breathlessness, chronic fatigue, depression, diabetes mellitus, emphysema, eczema, high blood pressure, non-congenital heart conditions, hormonal disorders, immunodeficiency, obesity, pre-cancerous conditions, psoriasis, stress related disorders, sleep apnea, stroke and tumours

~100 “Non-diseases” (behavioural traits)



INCREASING COMPLEXITY AND BURDEN OF PATIENTS WITH CHRONIC DISEASES

Hospital, primary and social care systems struggling to cope with demand



PAYMENT SYSTEMS USUALLY BASED ON VOLUME NOT VALUE

People access the most convenient system
Not necessarily the “right” or cheapest.
Healthcare services recognise organisation boundaries: Diseases do not.



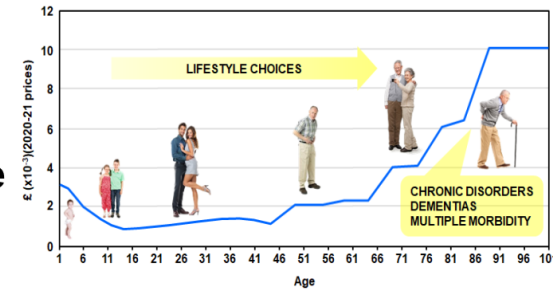
COMPLEX CASES HAVE VERY HIGH RESOURCE UTILISATION

Treatment is varied and does not support optimal outcomes.
Requires shared information and joined up approach



HOSPITALS ARE EXPENSIVE PLACES TO DELIVER CARE

Need for shared data and approach to give citizen-defined care supported by value-based payment



80% OF HEALTH DATA IS UNSTRUCTURED AND STORED IN MULTIPLE FORMATS SUCH AS LAB RESULTS, IMAGES AND MEDICAL TRANSCRIPTS

EACH PERSON WILL GENERATE ENOUGH HEALTH DATA IN THEIR LIFETIME TO FILL 300 MILLION BOOKS



16,000 HOSPITALS WORLDWIDE COLLECT DATA ON PATIENTS



LARGE AMOUNTS OF DIVERSE PATIENT DATA STREAMS IN THROUGH SENSORS, MONITORS AND INSTRUMENTS. THE ABILITY TO ANALYSE BIG DATA IN REAL-TIME WILL SAVE LIVES AND TRANSFORM HEALTHCARE

BY 2020, MEDICAL DATA IS EXPECTED TO DOUBLE EVERY 73 DAYS



PATIENT MONITORING PUMPS OUT AN AVERAGE OF 1,000 READINGS PER SECOND OR 86,400 READINGS PER DAY



WEARABLES (WRIST BANDS, WATCHES, SKIN PATCHES, TATTOOS) WILL GENERATE 44ZB BY 2020






**MISSION
IMPOSSIBLE**

The Holy Grail: Personalized Analysis


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Imaging files

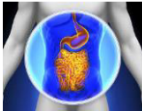
patientslikeme™
Social media


Email, text messages


Genomic data


Published Research

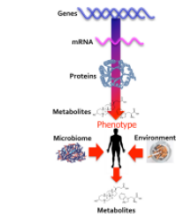

Remote Monitoring


Microbiomic data



EHR / EMR


eHealth apps

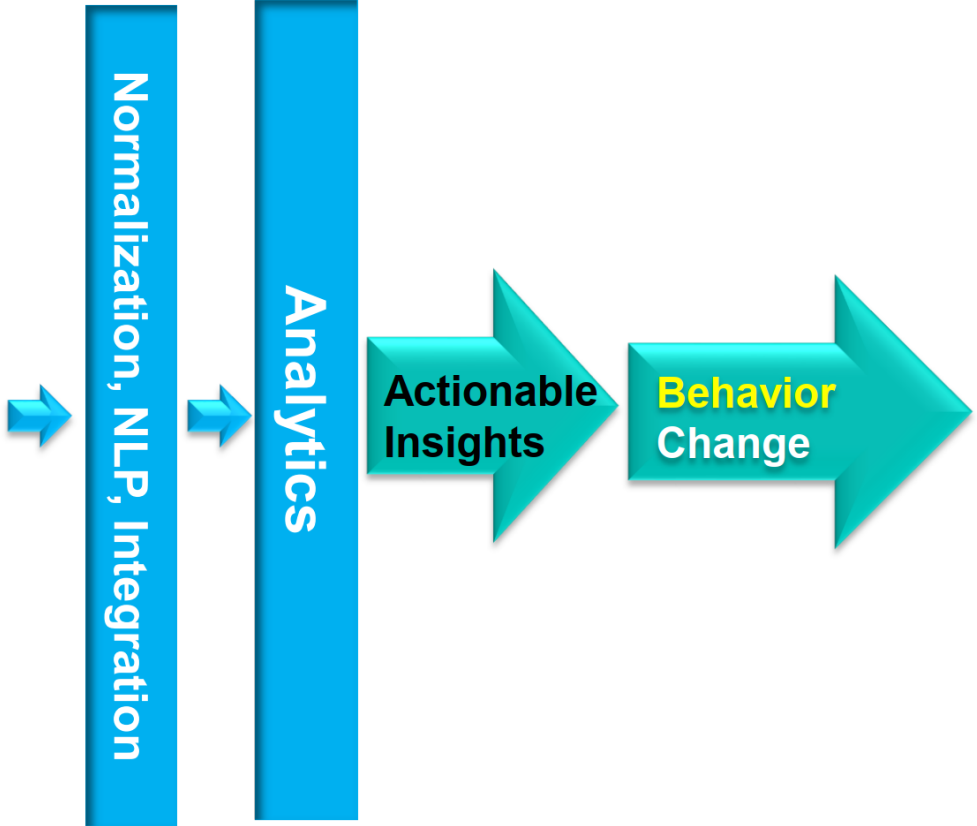

Clinician notes


Metabolomic data


Claims data


Biometric Sensors


Photos, Video

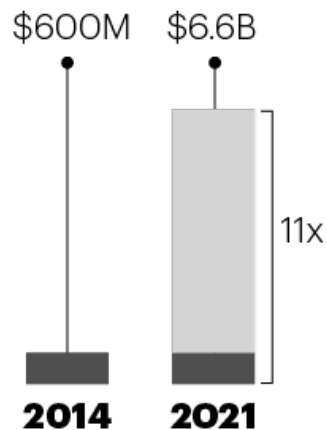


Source: Frost & Sullivan

HCLS TAM for BI/AI/BigData 2019: \$270B – 2030: \$508B

HEALTH AI MARKET SIZE 2014-2021

Acquisitions of AI startups are rapidly increasing while the health AI market is set to register an explosive CAGR of 40% through 2021



Source: Accenture analysis

Healthcare sector growth trend (US\$ billion)



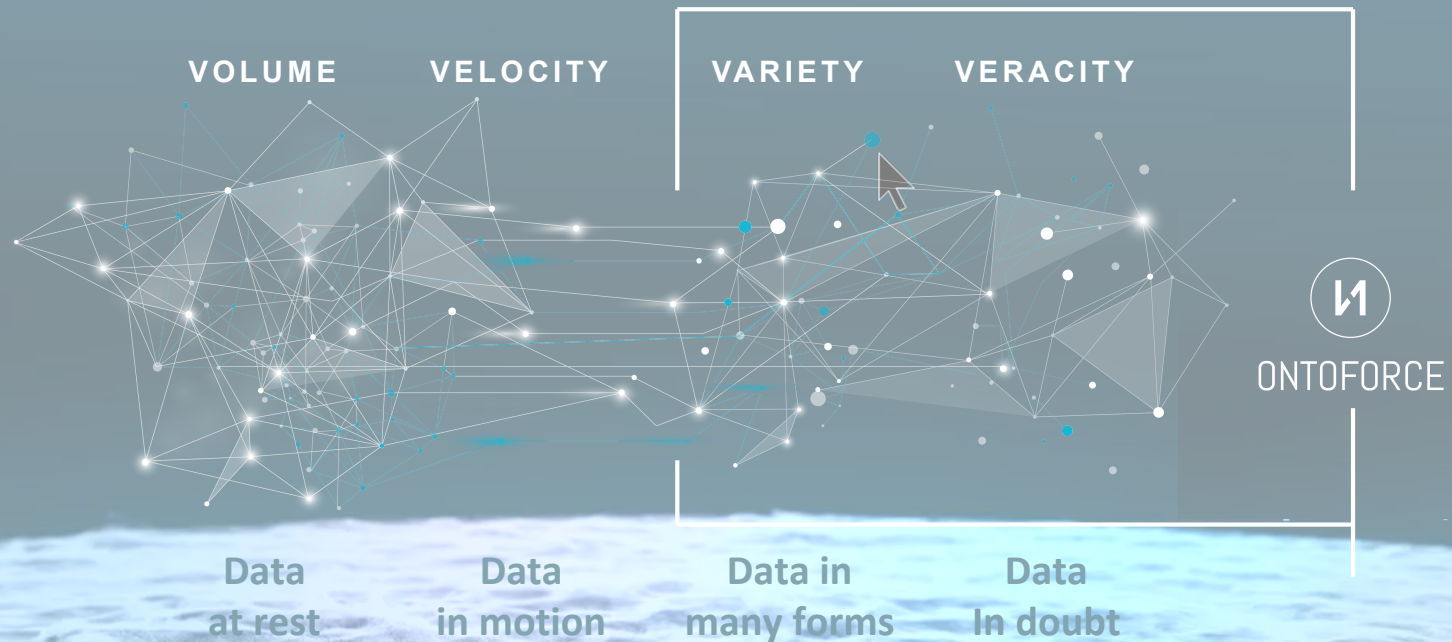
Source: Frost & Sullivan, LSI Financial Services, Deloitte, TechSci
Research Notes: E - Estimate, F - Forecast

**TAKE
A
BIG
FIGHT**



Big Data 4 V's

DATA VARIETY & DATA VERACITY



How to Untangle The Data Furball

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CITIZEN DATA SCIENCE

Find Knowledge in Minutes 

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DISCOVER

 ? ≡ 🔍

DISQOVER

euron disease, bulbar" or "Gehrig's dis" or "Lou gehrig dis" or "Bulbar motor neuron disease" ?

Expand query...

Select field of interest:

Clinical study (0)	Active Substances (0)	Adverse Events (0)
Model Organism (0)	Organism (0)	Organization (0)

Amyotrophic lateral sclerosis Core set

ALS | Gehrig's Disease | Amyotrophic lateral sclerosis
 Gehrig disease | Charcot disease | Gehrig's disease
 Motor neuron disease, bulbar | Gehrig's dis | Lou gehrig dis
 Bulbar motor neuron disease

SOD1 [Homo sapiens] Core set

ALS | IPOA | SOD1

IGFALS [Homo sapiens] Core set

ALS | IGFALS

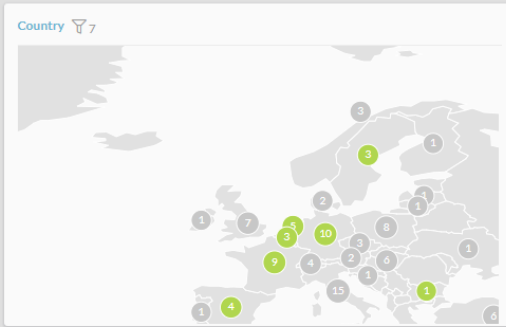
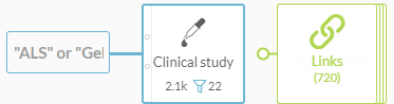
Ammoniumlaurylsulfate Core set

Als | Ammonium lauryl sulfate

ILVB_ARATH Core set

ALS | ILVB_ARATH | Acetohydroxy-acid synthase
 Protein CHLORSULFURON RESISTANT 1
 Acetolactate synthase, chloroplastic

Gene (0)	Homology (0)	Medical Device (0)	Medicine (0)
Classification (0)	Transcript (0)	Variant (0)	



Status (14)

2	not annotated	11	Terminated
222	Completed	5	Unknown status
112	Ongoing	4	Active, not recruiting
56	Not recruiting	4	Restarted
40	Prematurely Ended	3	Temporarily Halted
18	Recruiting	1	Authorised

Open in Visual Analytics Clear filters

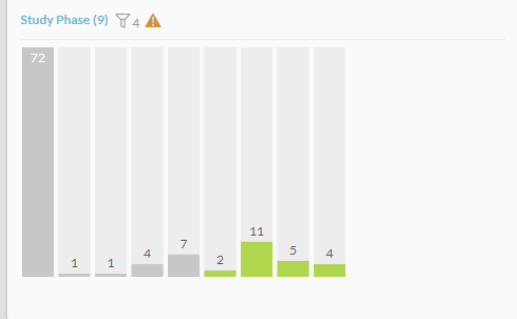
Clinical study (22)

1-20 of 22

- Olanzapine for the Treatment of Appetite Loss in Amyotrophic Lateral Sclerosis (ALS)
Source: ClinicalTrials.gov; WHO ICTRP
- Safety and Tolerability of Anakinra in Combination With Riluzole in Amyotrophic Lateral Sclerosis
Source: ClinicalTrials.gov; WHO ICTRP; ONTOFORCE
- MIROCAL: Modifying Immune Response and Outcomes in ALS
Source: ClinicalTrials.gov; ONTOFORCE
- A Study for Patients Who Completed VITALITY-ALS (CY 4031)
Source: ClinicalTrials.gov; EU Clinical Trials; WHO ICTRP; ONTOFORCE
- Evaluation of Metabolomic Analysis in Early Diagnosis of ALS
Source: WHO ICTRP; ClinicalTrials.gov; ONTOFORCE
- Placebo-controlled RCT of Botulinum Toxin A as a Treatment for Provoked Vestibulodynia
Source: ClinicalTrials.gov; WHO ICTRP; ONTOFORCE
- Symptomatic Treatment of Vascular Cognitive Impairment
Source: ClinicalTrials.gov; WHO ICTRP; ONTOFORCE
- Feasibility and Effects of Valaciclovir Treatment in Persons With Early Alzheimer's Disease
Source: ClinicalTrials.gov; WHO ICTRP
- Clinical Trial for the Regeneration of Cartilage Lesions in the Knee
Source: ClinicalTrials.gov; WHO ICTRP; ONTOFORCE
- Allogeneic Hematopoietic Stem Cell Transplantation
Source: ClinicalTrials.gov; WHO ICTRP
- OnabotulinumtoxinA for the Treatment of Urinary Incontinence Due to Overactive Bladder in Pediatric Patients
Source: ClinicalTrials.gov; WHO ICTRP; ONTOFORCE
- EXpanded CELL ENdocardiac Transplantation (EXCELLENT)
Source: ClinicalTrials.gov; WHO ICTRP; ONTOFORCE
- A Phase 2b study for adults hospitalized with Respiratory Syncytial Virus.
Source: EU Clinical Trials; WHO ICTRP; ClinicalTrials.gov
- A Phase 2b study for adults hospitalized with Respiratory Syncytial Virus.
Source: EU Clinical Trials; WHO ICTRP; ClinicalTrials.gov
- A Phase 2b study for adults hospitalized with Respiratory Syncytial Virus.
Source: EU Clinical Trials; WHO ICTRP; ClinicalTrials.gov
- A Phase 2b study for adults hospitalized with Respiratory Syncytial Virus.
Source: EU Clinical Trials; WHO ICTRP; ClinicalTrials.gov

Type of Study (1)

22 Interventional



Condition (58)

- 4 Amyotrophic lateral s...
- 4 Motor neuron disease
- 4 Respiratory syncytial...
- 4 Sclerosis
- 3 Amyotrophic Lateral ...
- 2 Impaired cognition

Gender (2)

21 All

1 Female

MeSH Condition Classificati... (29)

- 7 not annotated
- 4 Amyotrophic lateral s...
- 4 Motor neuron disease
- 4 Sclerosis
- 2 Impaired cognition

Collaborator (matched) (8)

- 18 not annotated
- 1 Array BioPharma (Un...
- 1 German Cancer Rese...
- 1 Istituto Ortopedico ...
- 1 Max Planck Institute ...

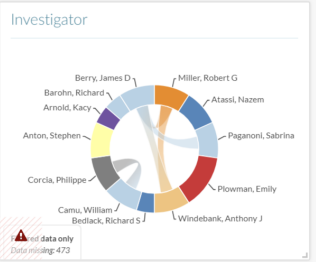
MeSH Intervention (25)

- 12 not annotated
- 3 riluzole
- 2 Botulinum Toxins, Ty...
- 2 Botulinum Toxins
- 2 abobotulinumtoxinA

Search in dashboards "ALS" OR "Gehrig's Disease" > Clinical study

Filter...

- Start
- New search
 - Created today:
 - "ALS" OR "Amyotrophic lat..." > Clinical study
 - "ALS" OR "Amyotrophic lat..." > Project
 - "ALS" OR "Gehrig's Disease..." > Clinical study
 - "ALS" OR "Gehrig's Disease..." > Clinical study
 - "ALS" OR "Gehrig's Disease..." > Clinical study
 - "ALS" OR "Amyotrophic lat..." > Clinical study
 - "ALS" OR "Amyotrophic lat..." > Publication

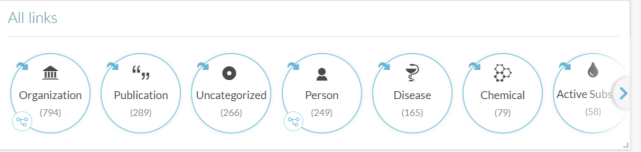
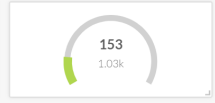


Text Search

"ALS" OR "Gehrig's Disease" OR "Charcot disease" OR "Mot"

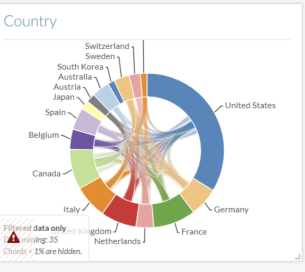
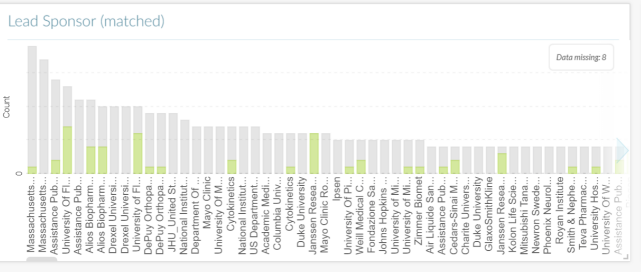
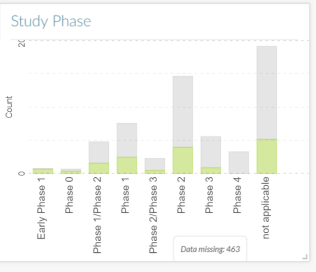
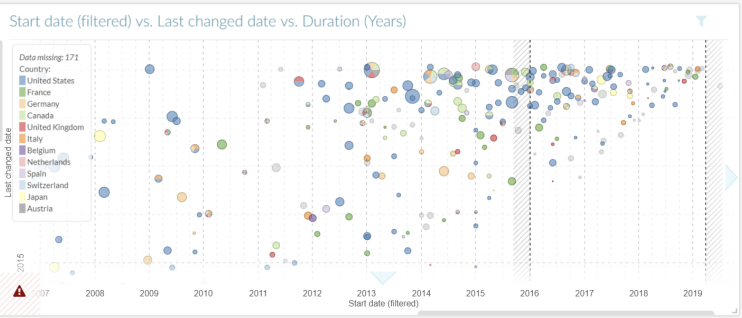
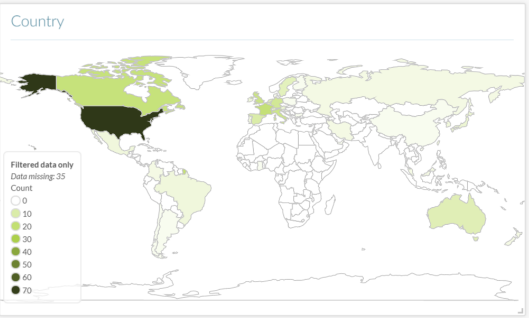
Type of Study

Interventional



Start date (filtered)

From: 01/01/2016
Until: 03/25/2019



- Rapamycin Treatment for ALS
- EH301 for the Treatment of ALS
- A Study of Protein Metabolism, Microbiome and Investigational Probiotic Use in Patients With ALS
- The Effect of RNS60 on ALS Biomarkers
- Cervical Electrical Stimulation for ALS
- Safety of Caprylic Triglycerides in ALS: A Pilot Study
- ALS Reversals - Lunasin Regimen
- A Clinical Trial of Pimozide in Patients With Amyotrophic Lateral Sclerosis (ALS)
- ALS Treatment Extension Study
- Dual Treatment With Lithium and Valproate in ALS
- A Study of IPL344 in the Treatment of ALS Patients
- A Pilot Study of the Utility of 3D Printed Masks for ALS Subjects
- Brown Adipose Tissue in ALS
- Open-label Clinical Trial of Lacosamide in ALS
- AMX0035 in Patients With Amyotrophic Lateral Sclerosis (ALS)
- Respiratory Strength Training in Persons With Amyotrophic Lateral Sclerosis (ALS)
- Accurate Screening Tools for Dysphagia in Amyotrophic Lateral Sclerosis (ALS)
- The Use of Airway Clearance Devices in ALS
- Evaluation of the Safety and Efficacy of ALS-L1023 Administered in Combination With Ranibizumab in Patients With Wet-AMD
- Perampanel for Sporadic Amyotrophic Lateral Sclerosis (ALS)
- IC14 for Rapidly Progressive Amyotrophic Lateral Sclerosis (ALS)
- Safety of Urate Elevation in Amyotrophic Lateral Sclerosis (ALS)
- A Study for Patients Who Completed VITALITY-ALS (CY 4031)
- Open-label Study to Evaluate Safety, Tolerability and PK of BHV-0223 in ALS
- Clinical Trial of Ultra-high Dose Methylcobalamin for ALS
- Music Therapy Protocol to Support Bulbar and Respiratory Functions in ALS
- Treatment Effect of Edaravone in Patients With Amyotrophic Lateral Sclerosis (ALS)
- Safety and Efficacy of TUDCA as add-on Treatment in Patients Affected by ALS
- Brain Excitability and Connectivity in Sensory-motor Pathways in ALS
- Non-invasive Brain Stimulation for the Treatment of Depression Symptoms in ALS

Clinical information

MeSH Intervention

2	Antibodies, Monoclonal
2	Antibodies, Monoclonal
2	Antibodies, Monoclonal

Condition

99	Amyotrophic Lateral Sclerosis
98	Motor Neuron Disease
77	Sclerosis

MeSH Condition Classification

98	Motor Neuron Disease
18	Motor Neuron Disease
3	Muscular Dystrophies

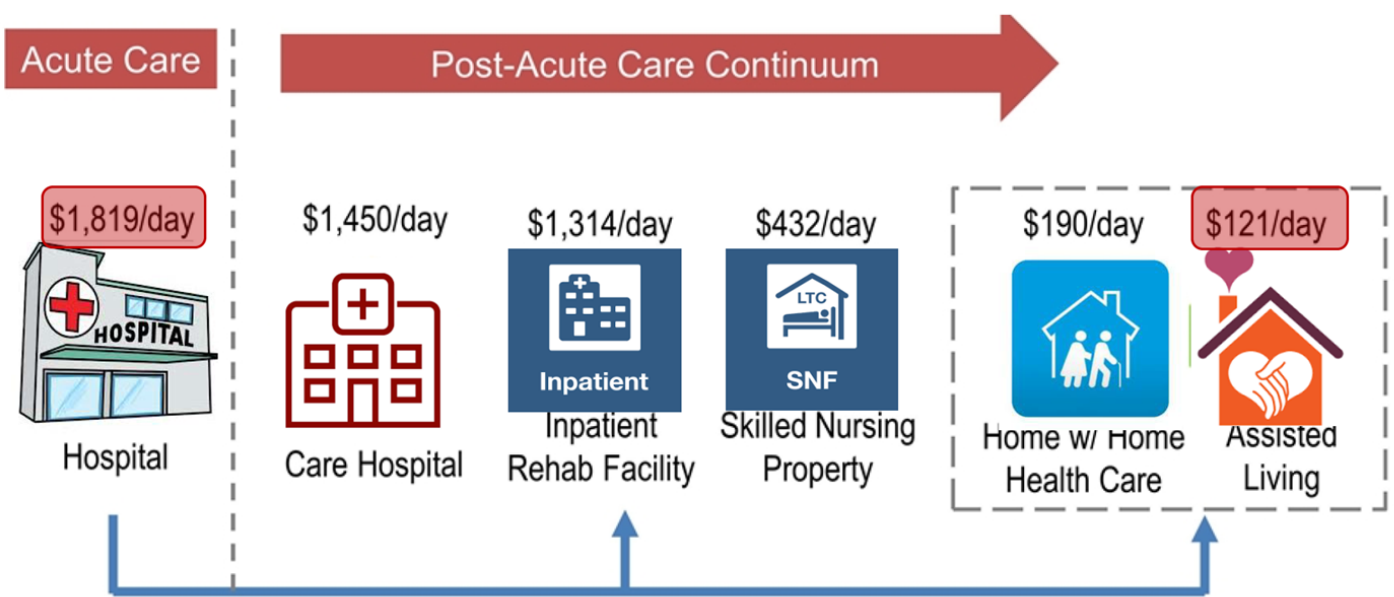
Registry

54	ClinicalTrials.gov
1	Clinical Trials Register

Data & AI Transforming

Sick Care into HealthCare

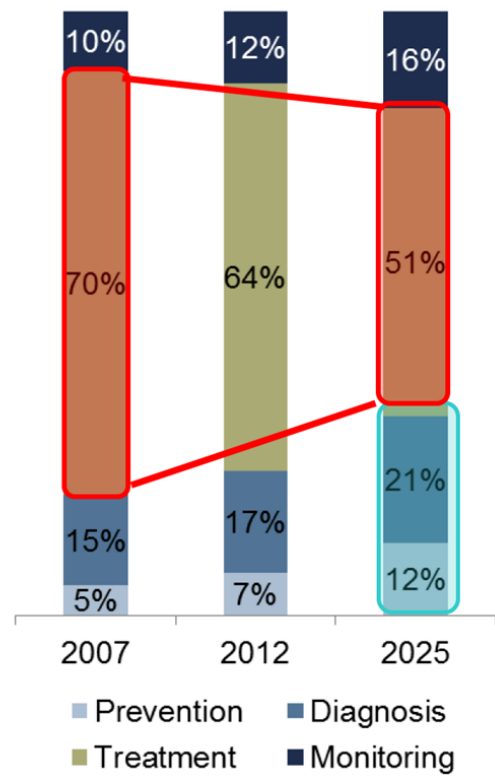
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Sources: Medicare Payment Advisory Committee (MedPAC), Report to Congress, March 2012; American Hospital Association (AHA) Statistics, 2012 Edition; Genworth Financial 2013 Cost of Care Survey; MEDICARE& MEDICAIDRESEARCH REVIEW/ 2012 Statistical Supplement; NIC MAP® Data Service 1Q 2013

Source: Frost & Sullivan

Healthcare Spending by Type of Activity, Global, 2007–2025



	TRADITIONAL MEDICINE	FUTURE MEDICINE
POINT-OF-CARE	Hospitals, clinics, labs 	Homes, workplace 
REFERENCE POINT	Population 	Individual 
ORGANISING PRINCIPLE	Hierarchy 	Partnership 
DATA OWNERSHIP	Institutions 	Patients 
PHYSICIAN'S ROLE	Authority 	Guide 
KNOWLEDGE BASE	Ivory tower of knowledge 	Social media/ crowdsourcing 
DIGITAL/PRECISION MEDICINE	Limited penetration One-size-fits-all 	Digital literacy is driving force for digital healthcare 

@ EAHM
13 - 2019

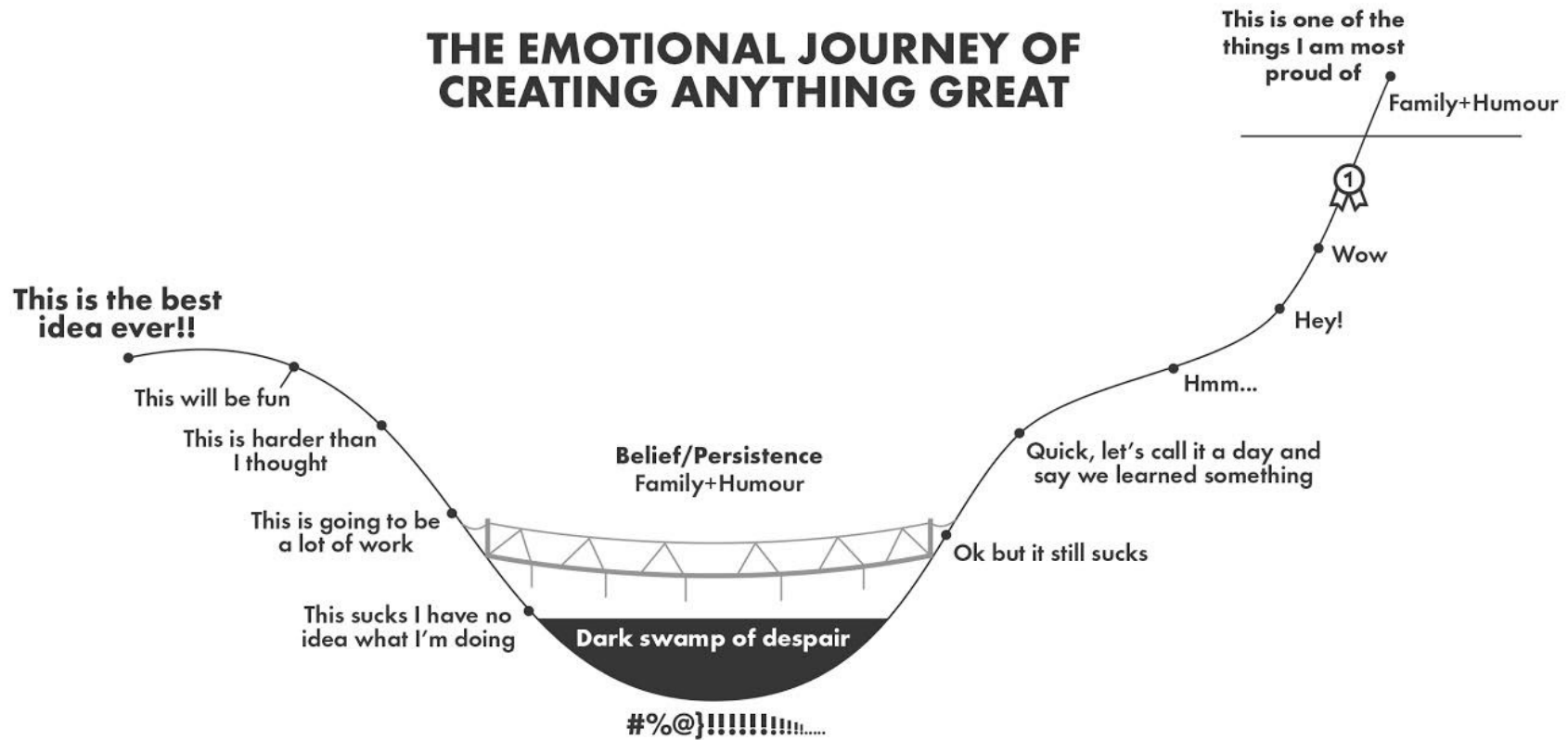
**Dare To Be
Different**



AI Can Be Wonderful
but remember ... Data First
Keep Innovating
With focus on ROI
And the WHY

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THE EMOTIONAL JOURNEY OF CREATING ANYTHING GREAT



PERSEVERENCE



ONTOFORCE

Thank You

Hans Constandt

Hans.constandt@ontoforce.com

Skype: hconstandt

M: +32 (0) 477 566102



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