

Precision Medicine Informatics: What Hospitals, Physicians, and Payers Need to Know about Challenges, Approaches, and Best Practices

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If banking were like health care...

- Automated teller machine (ATM) transactions would take not seconds but perhaps days or longer as a result of unavailable or misplaced records.

Source: Institute of Medicine – 2013 Report on Best Care at Lower Cost



If home building were like health care...

- Carpenters, electricians, and plumbers each would work with different blueprints, with very little coordination.

Source: Institute of Medicine – 2013 Report on Best Care at Lower Cost



If shopping were like health care...

- Product prices would not be posted, and the price charged would vary widely within the same store, depending on the source of payment

Source: Institute of Medicine – 2013 Report on Best Care at Lower Cost

If automobile manufacturing were like health care...

- Warranties for cars that require manufacturers to pay for defects would not exist. As a result, few factories would seek to monitor and improve production line performance and product quality.

Source: Institute of Medicine – 2013 Report on Best Care at Lower Cost



If airline travel were like health care...

- Each pilot would be free to design his or her own preflight safety check, or not to perform one at all.

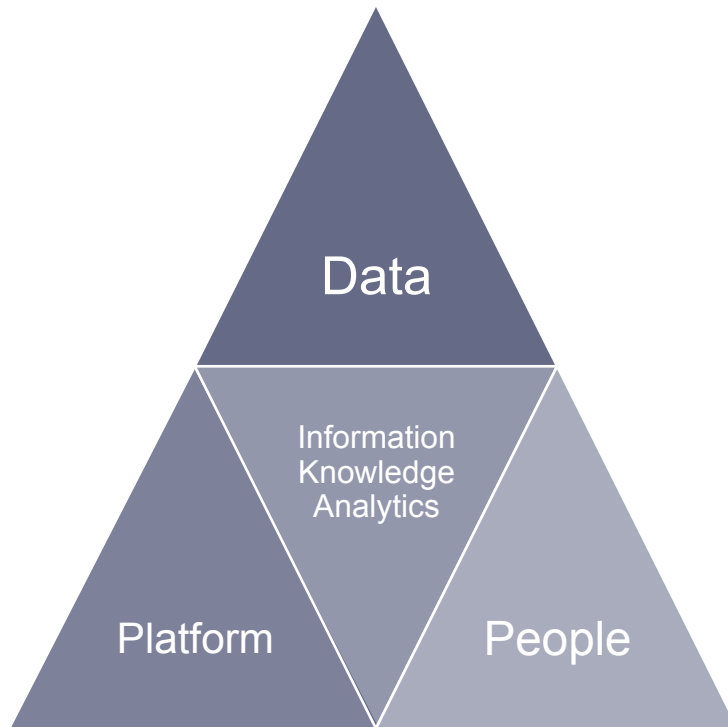
Source: Institute of Medicine – 2013 Report on Best Care at Lower Cost

Take home messages about healthcare from the 2013 IOM report:

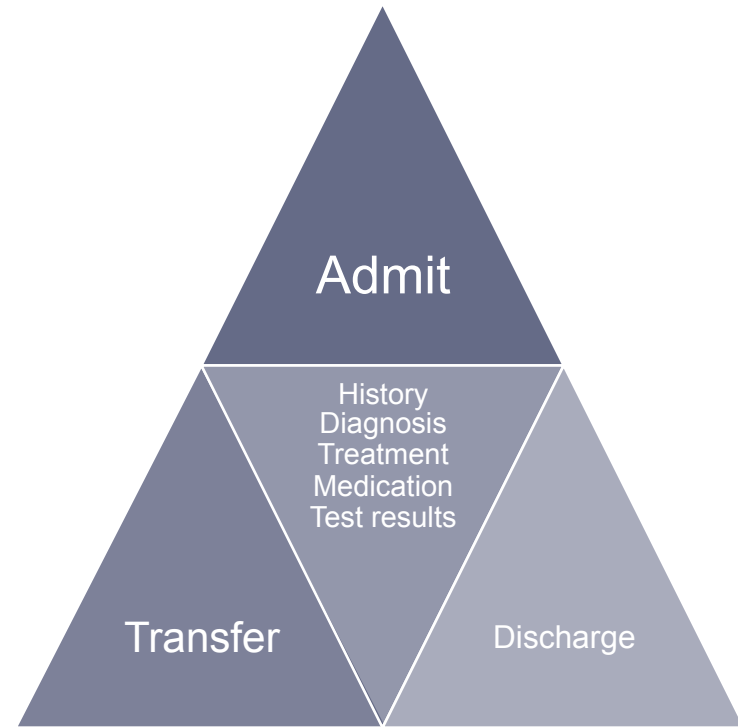
There is room for improvement in:

- **Data integration** like in banking
- **Coordination of efforts** between departments, like in home building
- **Price transparency** and **price consistency** regardless of payment method, like in retail shopping
- Coordinated incentives that **focus on improving quality outcomes** like in the auto industry
- Standardized **best practices** that mitigate risk, like in the airline industry

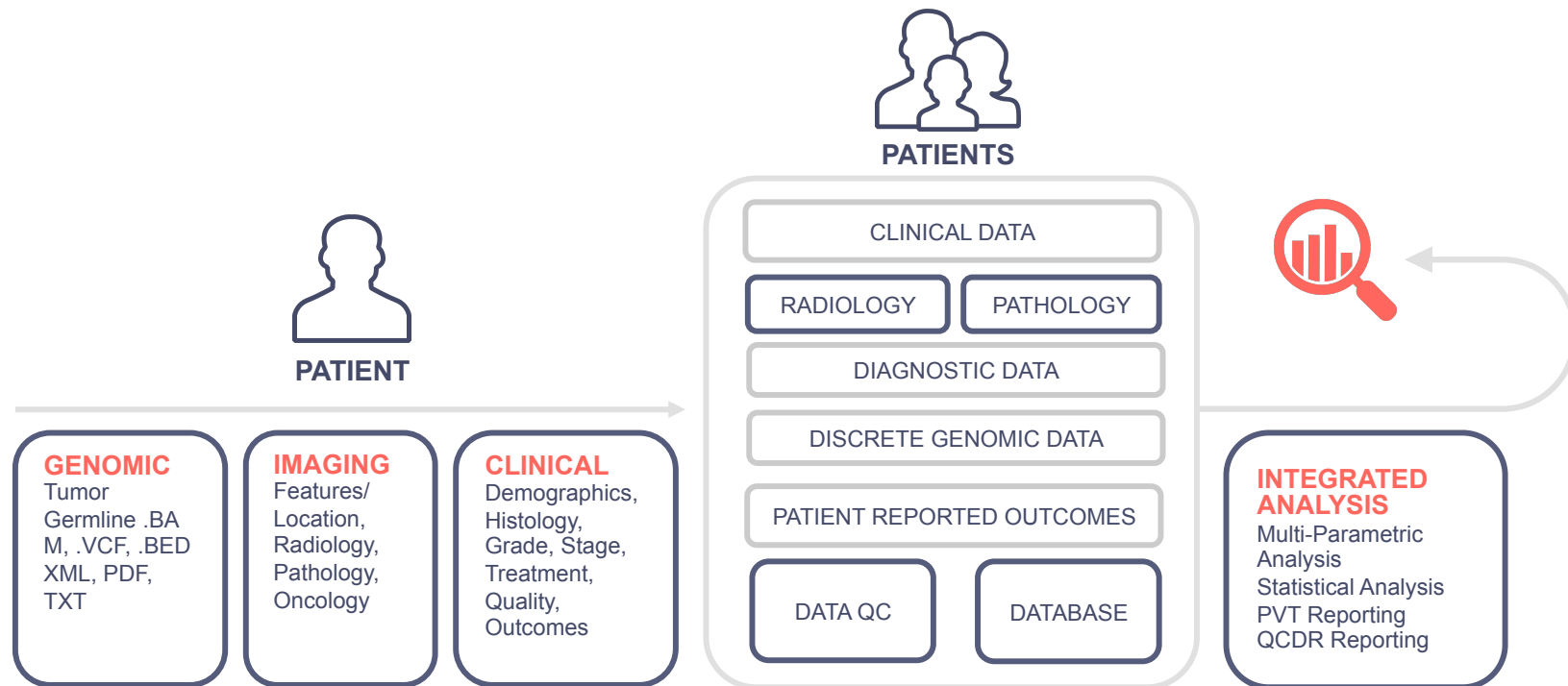
Informatics systems vs. records systems



Vs.



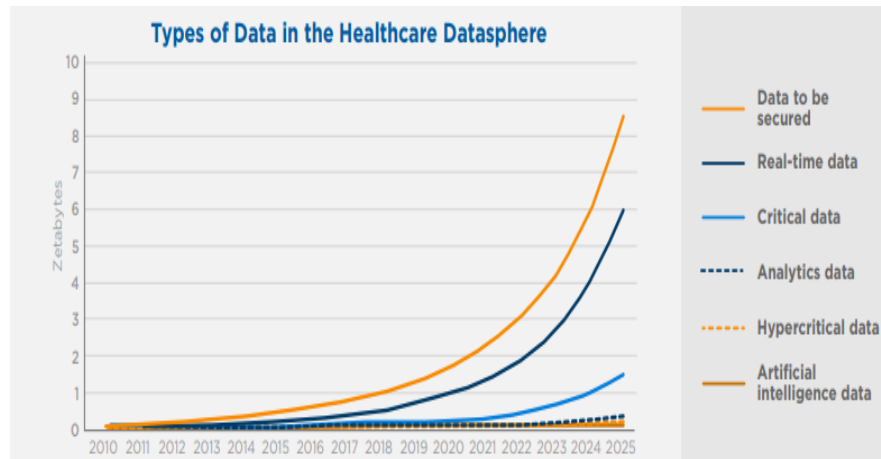
Health care information architecture and data model



Hospital informatics challenges

- Financial
- Operational
- People (new skill sets)
- Technical

Volume and types of data



Source: IDC Data Age 2025 Study

Data analytics challenges

Additional barriers

- Financial
- Operational
- People (new skill sets)
- Technical

Data and analytics initiatives fail for three primary reasons.

% of aggregated responses

Failure mode		Description
Limited adoption or integration	38	Inability to integrate analytics solutions into work flows Limited frontline adoption
Lack of strategic alignment and direction	26	Lack of stakeholder alignment or support Lack of clear road map
Poor data quality	17	Missing or incomplete data Data quality or accuracy issues Data fragmentation
Other	19	Missing team skills or capabilities Unclear use case scope Inability to articulate value
Total	100	

Source: 2016 McKinsey survey of data and analytics leaders at global life insurance and P&C insurance carriers

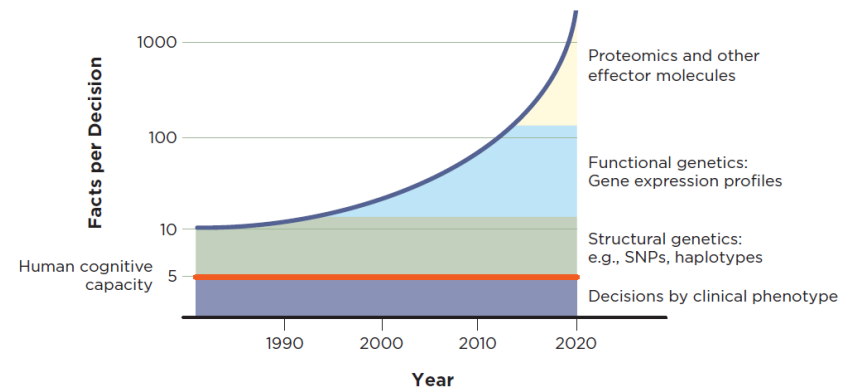
McKinsey&Company

Challenges in precision medicine

Physician and other health care provider burnout

- Access to relevant data within the workflow
- Documentation requirements
- Increasing administrative tasks
- Uncertainty over payer coverage
- Migration from fee-for-service to value-based care payment models

Data volume and complexity



Source: Institute of Medicine – 2013 Report

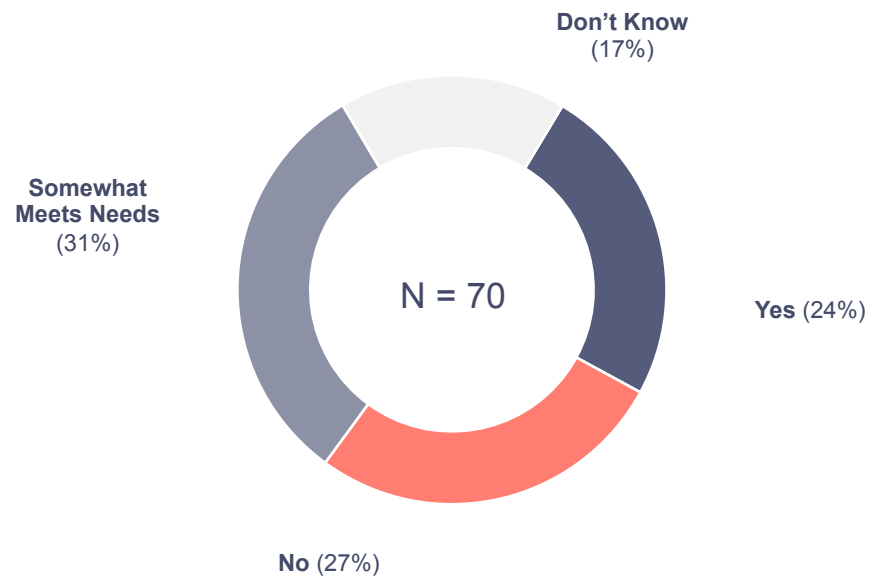
Precision medicine informatics survey: challenges, adoption, utilization and approaches

Goal: Define the best practices through research

Care Team + Tech & Data + Approach = Better Outcomes

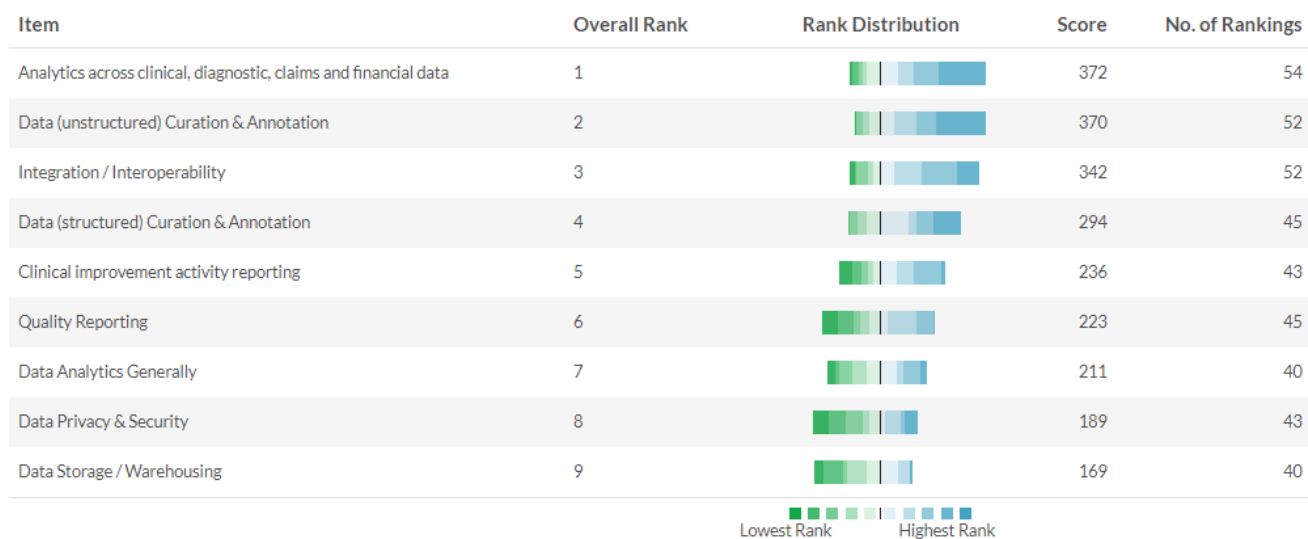
Are electronic health/medical record solutions meeting users needs for precision medicine?

Q: As part of your precision medicine program does your eHR, eMR or like solution meet the needs of your hands-on users?



Biggest IT systems or software challenges for precision medicine programs

Q: What aspects of data related IT systems or software are most challenging to address for your precision medicine program?



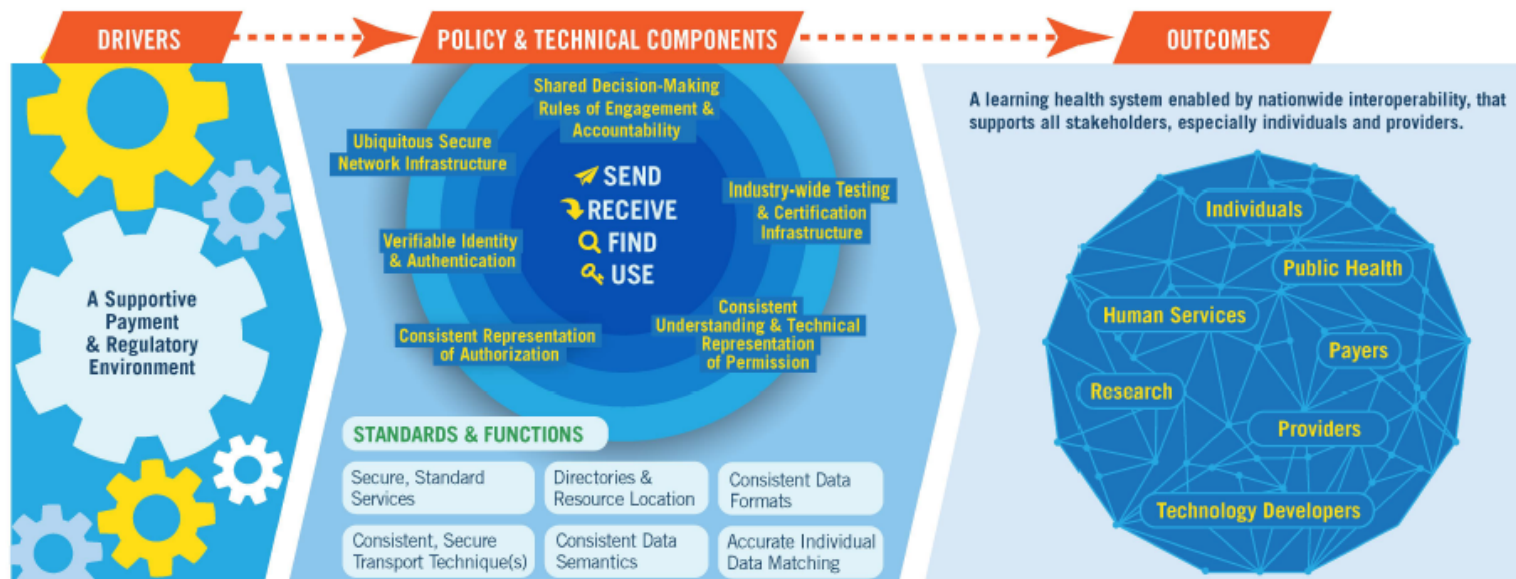
Biggest IT systems or software challenges for precision medicine programs

Q: What aspects of physician facing or patient facing IT systems or software are most challenging to address for your precision medicine program?

Item	Overall Rank	Rank Distribution	Score	No. of Rankings
EMR capabilities that enable Precision Medicine	1		286	54
Real-time Access to Patient Data within Provider Facing Case Management software	2		237	47
Real-time Access to Patient Data within Care Team Collaboration Software	3		225	45
Generating Customized Patient Reports	4		186	40
Clinical Trials Capabilities	5		177	43
Care Team Collaboration capabilities	6		171	39
Portal for Patient Reported Outcomes	7		163	42

Lowest Rank Highest Rank

Approaches: The ONC interoperability roadmap



Source: Connected Health and Care for the Nation – A Shared Nationwide Interoperability Roadmap

Best practices

GOAL: To empower better decision making, reduce burnout

- Clinical Decision support tools
- Care Team coordination tools
- Clinical trials matching
- Leverage technology to perform mundane tasks
- Data governance & stewardship
 - Quality and accessibility
 - Standards
- Analytics to support population health principles

Best practice research

Determine which approaches drive the greatest value

- Request Self Responses from completed PMI project
 - Who are the users, decision influencers
 - What technologies were used
 - What data was included
 - What value was derived
 - The approaches that were taken

Care Team + Tech & Data + Approach = Better Outcomes

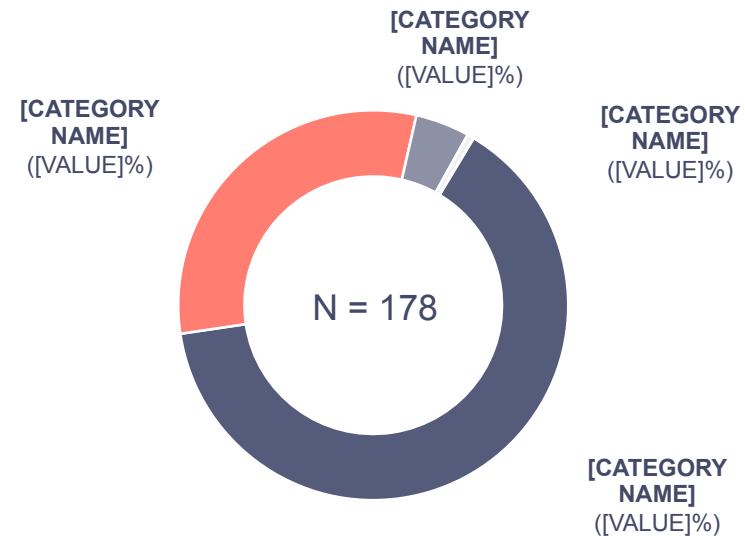
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Analytics

- Descriptive
- Predictive
- Prescriptive
- Risk stratification
- Outcomes - longitudinal patient centered view
- Converting data into information (actionable insights)

Future analytics include increased scope for artificial intelligence

- Data infrastructure
- Managing comorbidities
- Clinical decision support
- Clinical documentation improvement



Do you view artificial intelligence as something to support healthcare's existing business needs?

Source: Adapted from AWS xtelligent Healthcare media survey, 2018

Real-world data – current and future state

RWD Use	Now	Within 2 yrs	Within 3 to 5 yrs
Claims adjudication	33.3%	35.7%	31.0%
Justification of actionability	43.2%	43.2%	13.6%
Clinical utility evidence development	39.7%	39.7%	20.7%
Expansion of drug indications	34.0%	44.0%	22.0%
Drug Safety and efficacy	39.6%	39.6%	20.8%
Clinical trial matching	41.8%	38.2%	20.0%
Peer-reviewed publications	54.0%	30.0%	16.0%
Coverage decision making	30.2%	53.5%	16.3%
Disease insights	49.2%	32.2%	18.6%
Cohort studies	43.4%	35.8%	20.8%
Develop patient registries	43.1%	37.3%	19.6%
Regulatory submissions	28.9%	39.5%	31.6%

Future opportunities

- Patient engagement
- Wearables and medical devices
- Real world evidence



Source: Institute of Medicine – 2013 Report



Thank You!

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