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Transformation of Health Industry Through Performance Pyramid

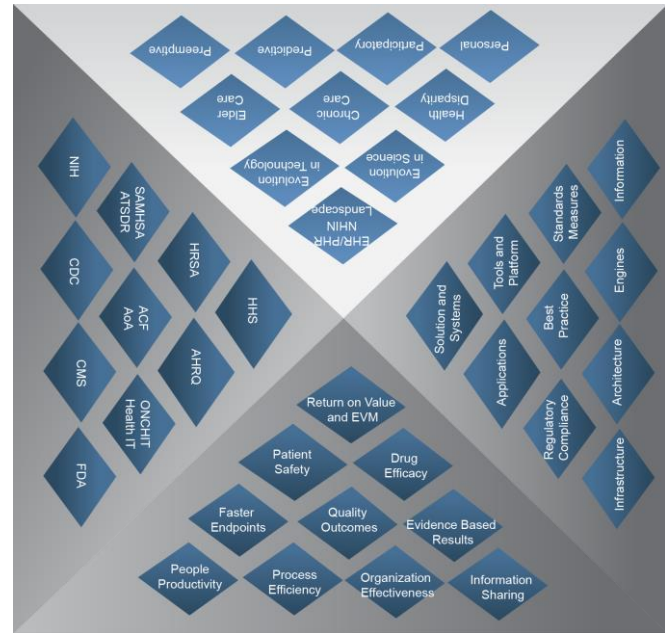
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Providing Excellent End-to-End Healthcare to the Population with a 30% Reduction in Cost and Time.

INTRODUCTION

The American health industry costs \$3 trillion today, represents 18% of the GDP, and is expected to grow to over \$4 trillion and 25% of GDP by 2020. However, this does not cover the 20% of the population (60 million) who would require universal coverage and innovative sustainable disease management mechanisms such as: advances in science and technology, convergence of its segments (public health, health research, healthcare and health education, etc.) and substantial reduction in fragmentation and fraud. The industry, made up of government, non-profit, and commercial organizations, needs to harmonize and develop a plan that covers all of its stakeholders while delivering a high Return On Investment (ROI).



The solution is there; this paper discusses the proven concept and execution process. Imagine if we treated the health Industry as a pyramid, the most sustainable, efficient, organized, and long-lasting structure in the world. If one reorganizes the health industry in that context, one can better understand and therefore deliver complete healthcare coverage to the public with high ROI. It is possible that with the use of health IT, process reengineering, organization optimization, and stakeholder collaboration one can reduce the healthcare cost by 30%, while providing the best patient care.



THE PERFORMANCE PYRAMID

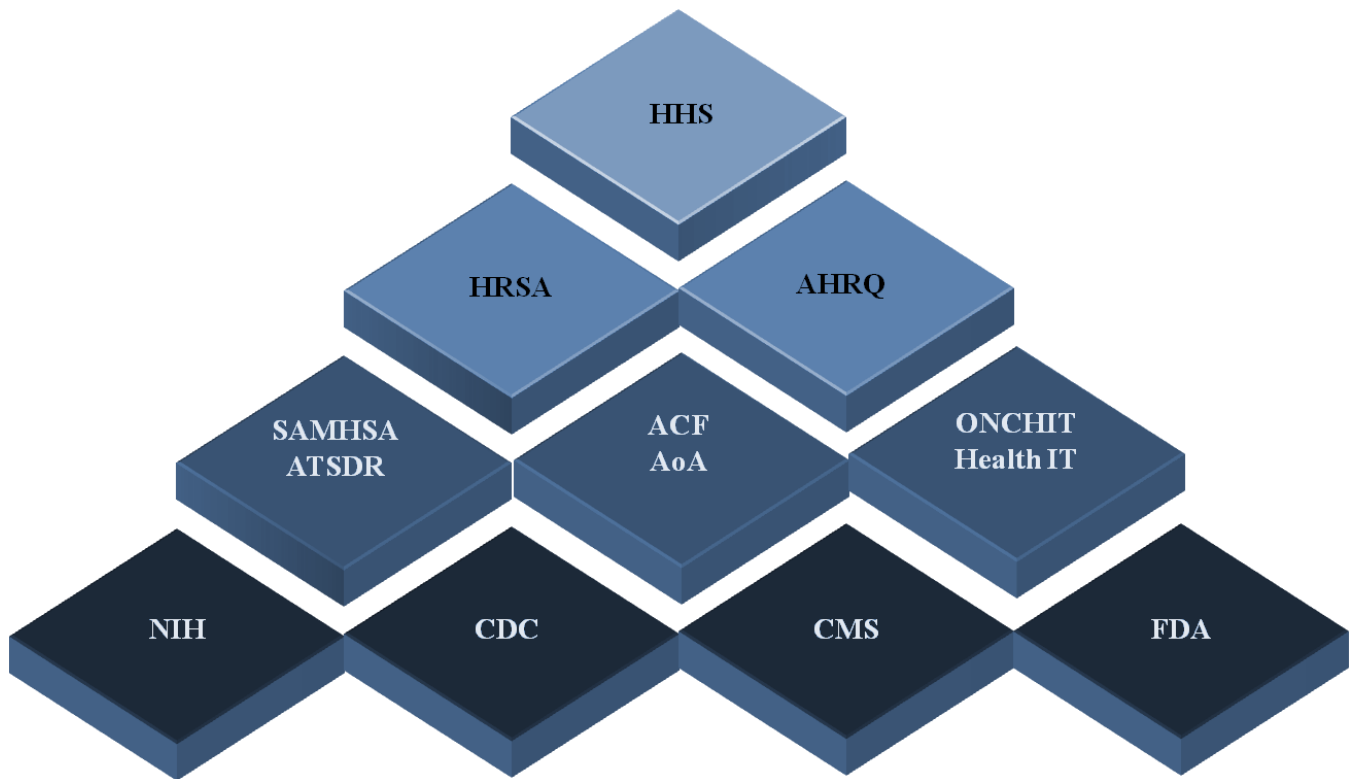
The pyramid has a base that describes the overlapping healthcare segments and their interrelationships. The four sides depict the organization structure and management of the government side of the industry; the needed framework for building universal healthcare and disease management; the performance mechanisms' to deliver high ROI and best patient care; and information technology solution components that deliver the outcome.

The Base of the pyramid describes the overall health industry describing the major segments of the industry:

- Public Health: Population is managed for awareness, surveillance, control, prevention, and epidemiology of disease.
- Health Research: Research, discovery, development, and delivery of new therapies, treatments, drugs, devices, and technologies for disease management.
- Healthcare: Providers, such as hospitals, clinics, and other facilities, serve the patients through physician care.
- Health Education: All stakeholders are trained by academic medical and research institutes, hospitals, community colleges, associations, and the private industry.
- Policy: The government defines, designs, develops, deploys, and administers programs.
- Communication: Proper outreach of information through local, regional, national, and international media.
- Networking: Public and private stakeholders, associations, foundations, and trade organizations come together to tackle the industry problems, run

- conferences, and hold workshops in science, technology, policy, and solutions.
- Technology: IT and other technologies are developed, implemented, and operated to serve patient needs across the industry (healthcare provider, research, and education facilities).

The First Side of the pyramid depicts government management and governance: This side describes The Health and Human Services federal level and its various departments to manage health problems.



Beginning with the bottom layer:

NIH: National Institutes of Health conducts research to find new treatments, therapies, drugs, and devices for preventative, diagnostic, and interventional treatments.

CDC: Centers for Disease Control provides needed information for awareness, preparedness, surveillance, prevention, and management of onset of the both infectious and chronic diseases.

CMS: Center for Medicaid and Medicare provides cost coverage for those with chronic diseases, the elderly, and the disabled and underserved while providing intelligence to other institutes about patterns in the population.

FDA: Food and Drug Administration provides governance in approval of new drugs and devices and oversees food processing to assure population safety.

SAMHSA and ATSDR: Substance Abuse and Mental Health Services Administration and Agency for Toxic Substances and Disease Registry provide services to manage the special needs and support to this segment of the population.

ACF and AoA: Administration of Children and Family and the Administration of Aging provide services to manage special needs of children, family, and elderly.

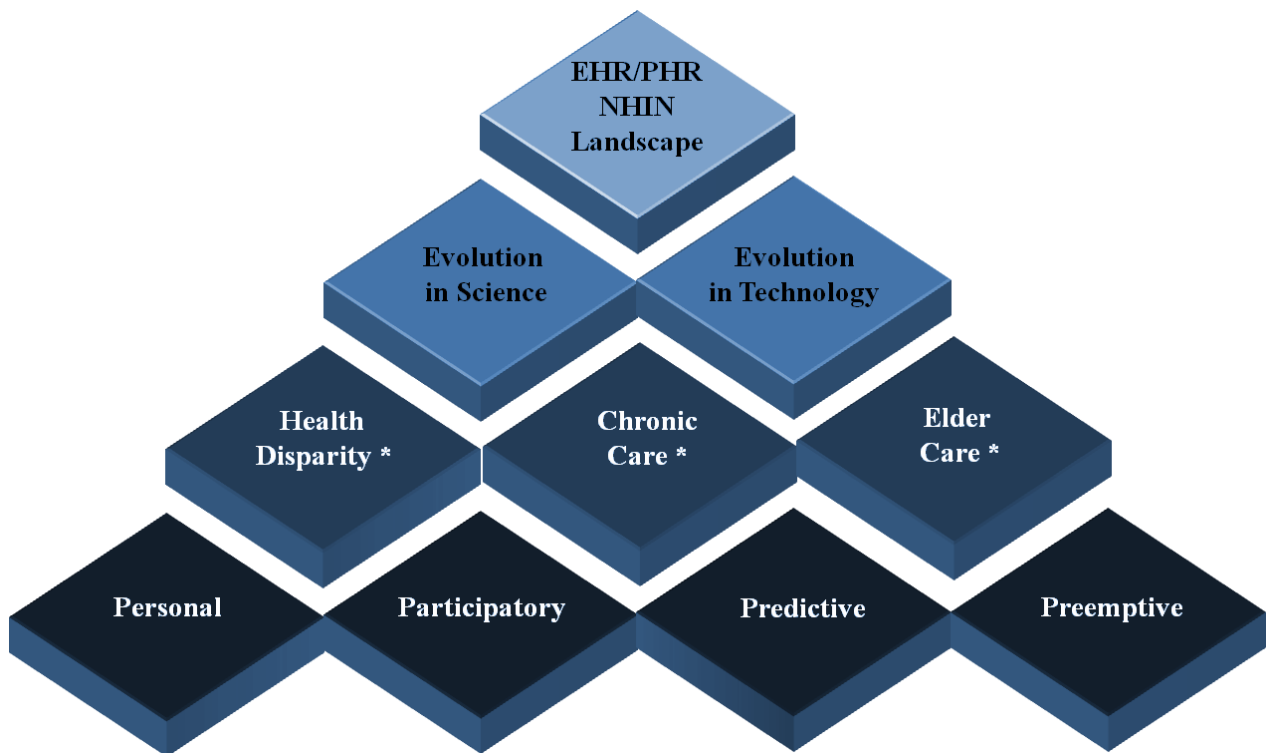
ONCHIT and Health IT: Office of National Health Information Network for Information Technology provides policy, guidelines, and program support to build IT infrastructure, architecture, technologies, and processes to have universal Electronic Health Record (EHR) and Personal Health Record (PHR) for the population.

AHRQ: Agency for Healthcare Research and Quality provides outcome performance measures, quality requirements, and research support across the health industry needs.

HRSA: Health Resources and Services Administration provides oversight across the health industry for outcome performance measures, quality requirements, and research support, with special emphasis on health disparity.

HHS: Health and Human Service headquarters carries out governmental policy, program, management, and implementation responsibilities to serve the healthcare needs of the population as a whole.

The Second Side of the pyramid depicts the major emphasis areas that would make health care universal:



Beginning with the bottom:

Personal: Healthcare needs to be on individual basis. Although diseases may be similar, every human being needs to be individually managed due complex and individual mechanisms requiring the right combination of drugs and therapies. With the recent developments in science in biology and the advent of translational research, this is now possible.

Participatory: Collaboration between stakeholders, especially among physicians and patients, is needed to improve patient lives and provide better and faster cures and maintenance of the diseases.

Predictive: Technology exists to predict the predisposition and pre-symptomatic stages of many diseases. The highest priority should be placed on screening, diagnostics, and prevention.

Preemptive: A companion to predictive mechanisms, preemptive efforts will not only improve patient lives but also save substantial cost to healthcare industry.

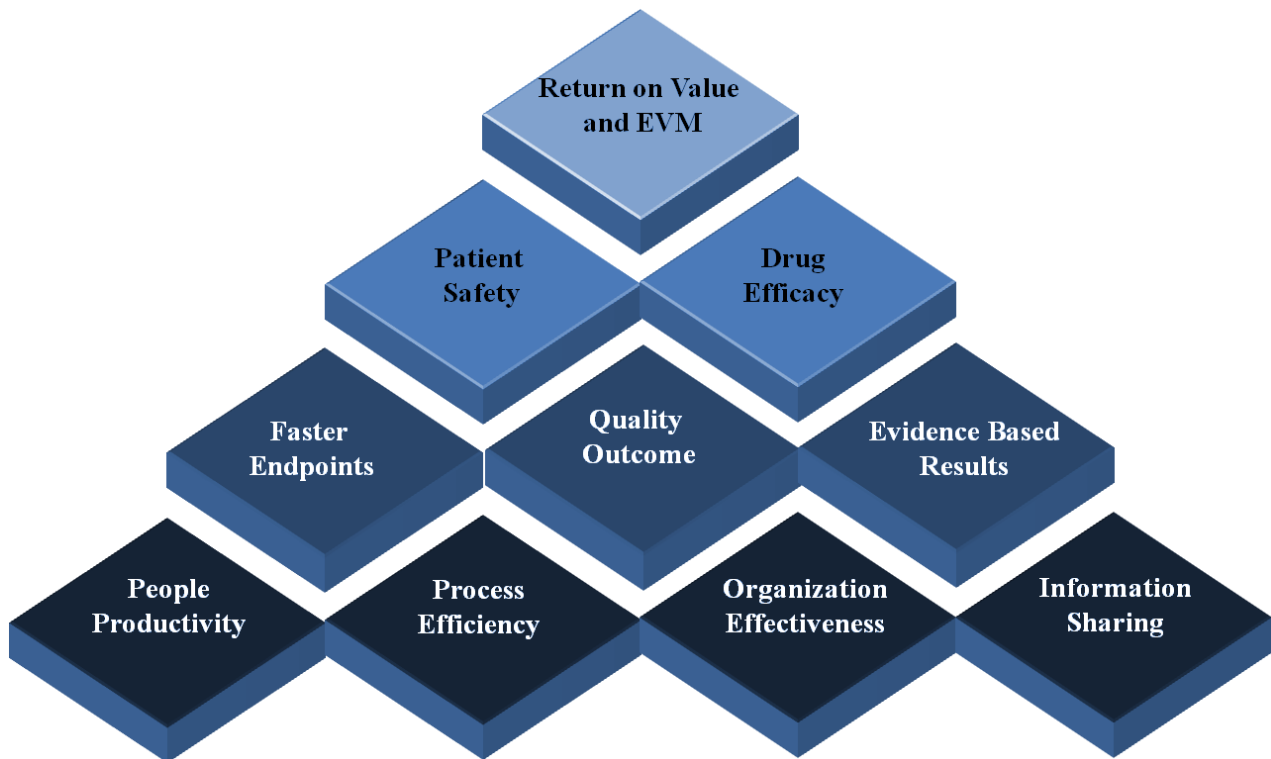
Health disparity, chronic care, and elder care: These three segments require overlapping needs and covers over 65% of the overall healthcare budget. Focusing on improvements across public health, health research, healthcare, and education among this population will not only serve the national interest, but also save substantial costs.

New sciences and technology: The ultimate success in healthcare is to come from investments in science, such as biological, genomics, proteomics, clinical, medical, and translational, and the technologies of physics, chemistry, nano, information, computational, energy, and environment.

EHR/PHR and NHIN: Ultimate success will come from covering all of the population in the prevention and management of their diseases while contributing substantially to the national economy through having a Nationwide Health Information Network that would

provide to every citizen an EHR and PHR, which will substantially contribute to the best patient care and lowest cost.

The Third Side of the pyramid depicts how to build the highest return on investment, while best serving patients. This performance side of the pyramid needs to be implemented across the whole healthcare industry:



Beginning with the bottom:

People Productivity: An implementation of information technology and other communication mechanisms will improve people productivity by increasing throughput per stakeholder (e.g. being able to see more patients per day without comprising care).

Process Efficiency: To reduce time in care, such as reducing time in clinical trial activation, the industry needs to streamline processes and eliminate rate limiting steps and bottlenecks to speed up the process.

Organization Effectiveness: Institutional review boards and data safety management boards need to eliminate, merge, realign, or reorganize various overlapping and duplication functions to make organization more effective in their role.

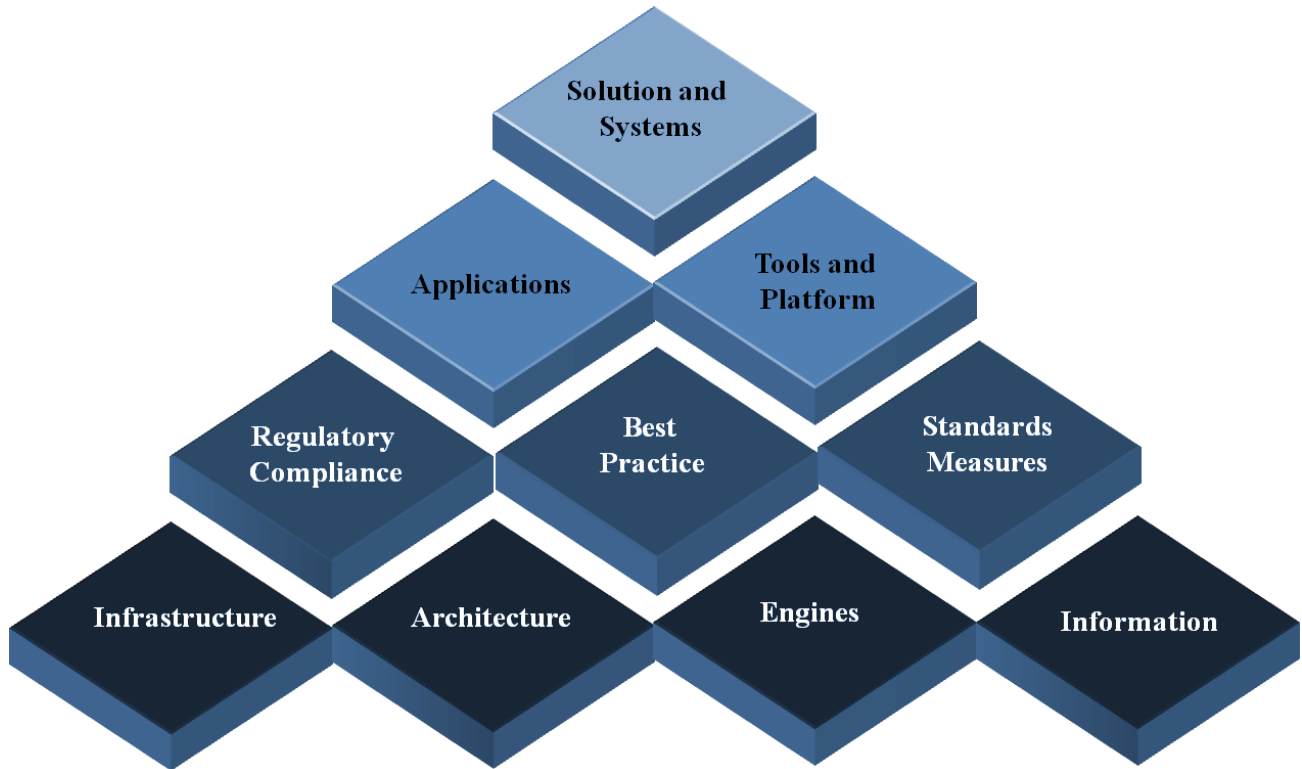
Information Sharing: The industry needs to provide all stakeholders, especially physicians and patients, the right information at the right time to help manage disease and provide for better patient care. For example, this will avoid adverse events with drug combinations or timely intervention and collaboration between doctors for specific patient needs.

Faster endpoints, quality outcome, and evidence-based results: The impact of the bottom layer will be increasing the speed to get to the endpoint in decision-making for treatment, better quality outcome, and the ability to measure results based on evidence to apply to the other patients in a cohort and, ultimately, population. IT will deliver better prevention and intelligence for the population on an individual, cultural, regional, and national level.

Patient safety and drug efficacy: The impact of the last layer is more safety for patients and higher efficacy for drugs due to adherence to standards, regulatory compliance, and quality.

ROI, ROV, and EVM: The ultimate value of this side of the pyramid is overall best patient care, full coverage in population, and reduction in costs and time to deliver healthcare service, as measured through standard ROI and Earn Value Management (EVM) practices.

The Fourth Side of the pyramid depicts how a well defined, designed, developed, and deployed informatics solution can deliver the desired performance outcome:



Beginning with the bottom layer:

Infrastructure: A robust IT and telecom infrastructure that is compliant with meeting stringent federal government (FISMA), industry (ITIL), and the needed privacy protection (HIPAA) standards is central to the success of building a proper performance informatics solution.

Architecture: An open and service oriented architecture that facilitates open source, interoperability, and scalability among information systems that make data sharing viable is core to the success of building a proper performance informatics solution.

Engines: Appropriate data management, documents management, and workflow engines that facilitate proper information capture, management, analysis, dissemination, and archiving is central to the success of building a proper performance informatics solution.

Information: Sourcing the right information from the right sources; proper acquisition, validation, integration, harmonization, and usage of that information in decision-making processes; business intelligence; outcome decisions; and patient care is critical to the success of building a proper performance informatics solution.

Regulatory compliance, best practice, and standard measures: Meeting all aspects of the regulatory requirements, best practice mechanisms, and standards-based measures across all service domains such as clinical services (good clinical services, Code of Federal Regulations), software development (Capability Maturity Model and Rational Unified Processes), program management (Project Management Certifications, Earn Value Management), customer services (Six Sigma and total quality management) and operational services (CDISC and HL7 and ISO) is critical to the success of building a proper performance informatics solution.

Applications: Building appropriate applications that serve the specific purpose of public health, health research, healthcare, and health education with the right functions, features, and benefits, which utilize the capacity of the bottom two layers, is central to the success of building a proper performance informatics solution.

Tools and platforms: Building applications using standardized tools and a common platform will not only speed up the development and upgrade process, but also improve upgrade and maintenance while also delivering better interoperability and scalability, saving time and cost, and improving quality.

The final solution is a data warehousing system integrated with all other informatics solutions that will provide the needed information anytime, anyplace, and through any device to all relevant stakeholders. This system will be compliant with all regulatory standards and best practices and will be cheaper, better, and faster in serving the stakeholders' needs, therefore saving patients' lives.

Conclusion

The performance pyramid shows that through proper use of IT, process reengineering, and organization optimization, one can take the waste, gaps, duplication, and fragmentation currently found in the overall health industry and transform it into a end-to-end care solution for the whole population while reducing cost. This can be achieved in 10 years and will reduce the cost by 30% or over a trillion dollars. CTIS has developed a proof of concept for this application through their work at NIH, which has been validated by the NIH director awards and OMB calculations.