



XII INTERNATIONAL CONFERENCE MES-2018  
'Modern Engineering Systems. Architecture of Health'

## Global Healthcare Trends

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Principal and HEAL Market Group Leader,  
Cunningham Group Architecture

# 01 | GLOBAL TRENDS

Socio-Cultural/ Economic  
Technology  
Science



## 02 | SOCIO-CULTURAL/ ECONOMIC TRENDS



### Demographics

Aging Population

Lower Birth Rates

Longer Life Spans

### Resources

Capital Constraints

Scarcity

### Brand/ Experience

Informed Patients

Choices

### Health and Wellness

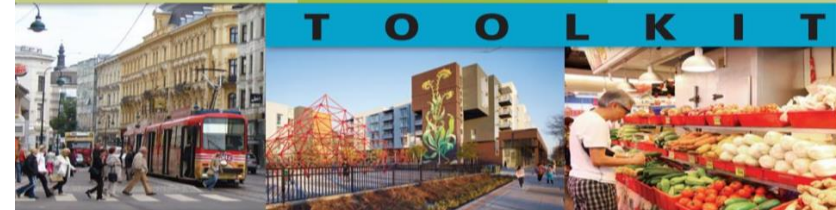
Cost Shift to Prevention

Climate Resiliency



## BUILDING HEALTHY PLACES

## TOOLKIT



STRATEGIES FOR ENHANCING HEALTH  
IN THE BUILT ENVIRONMENT

# 03 | SOCIO-CULTURAL/ ECONOMIC IMPACTS

## Demographics

Increase Demand and Strain on Services

Higher Acuity Patients

Need for Continuum of Care

Increase need for Specialty Care

## Resources

Shifting to Lower Cost Settings

Physician and Nursing Shortages

## Brand/ Experience

Exploring Better Experiences

Bifurcation of Rich and Poor Care

## Health and Wellness

Salutogenic Approach

Sustainable and Reliant Design

Majority of all deaths caused by 5 preventable diseases





## 04 | SOCIO-CULTURAL/ ECONOMIC RESPONSES

### Demographics

- Higher Percentage of Critical Care Beds
- Flexible / Multiuse Patient Rooms
- Growth of Specialty Services
- Independent Living to Hospice Care

### Resources

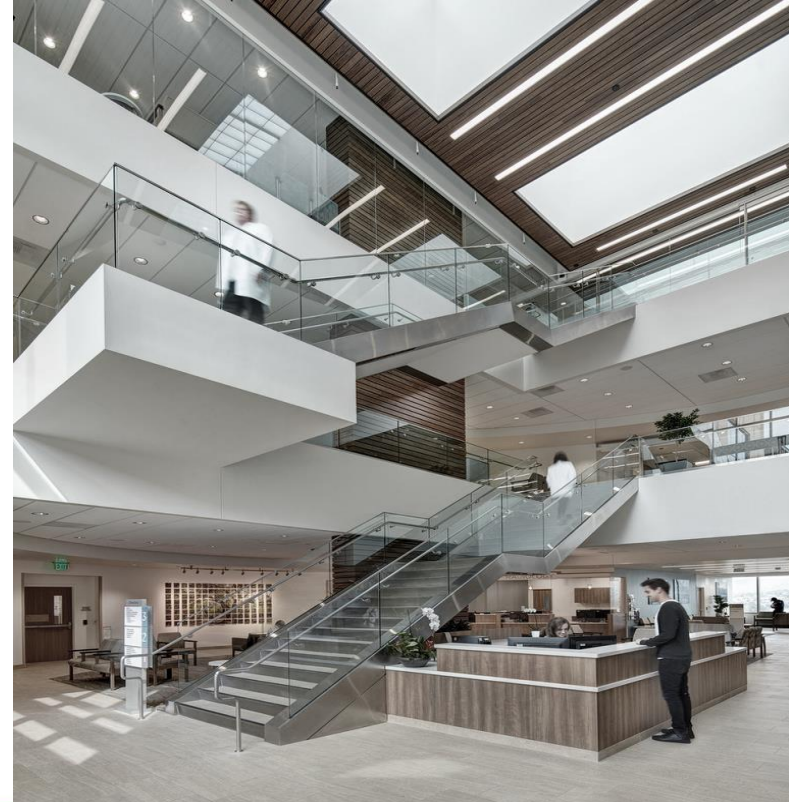
- Pushing Care to the Lowest Cost
- Robotics and Technology

### Brand/ Experience

- Influence of Hospitality / Concierge Care
- Expectation of On-Demand Services

### Health and Wellness

- Population Care Management
- Reduce Cost of Ownership



## 05 | TECHNOLOGY TRENDS

Medical Technology

Nano Technology

Artificial Intelligence/ Machine Learning

VR/AR/IR

3D Printing

Autonomous Vehicles

Building Technology

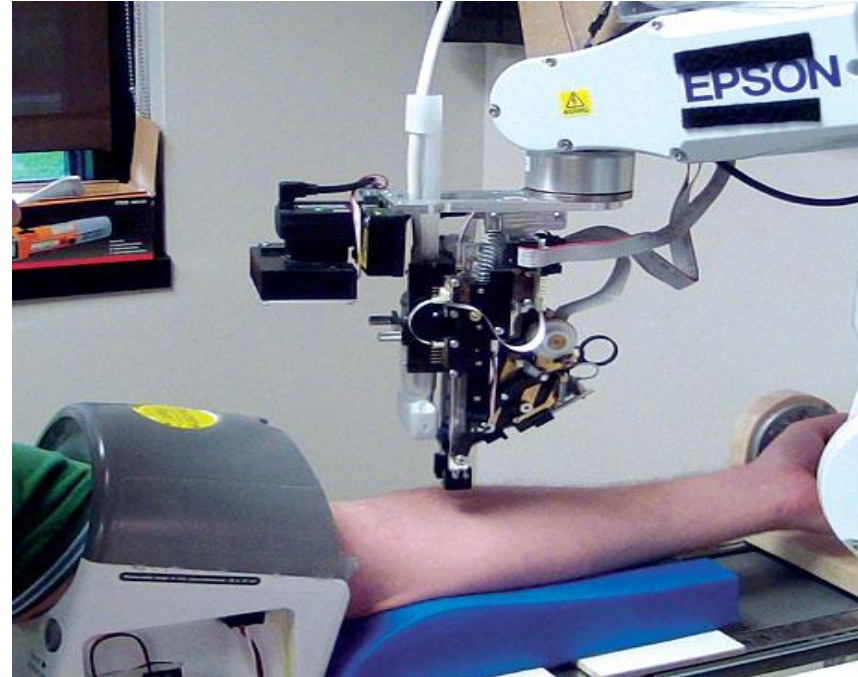
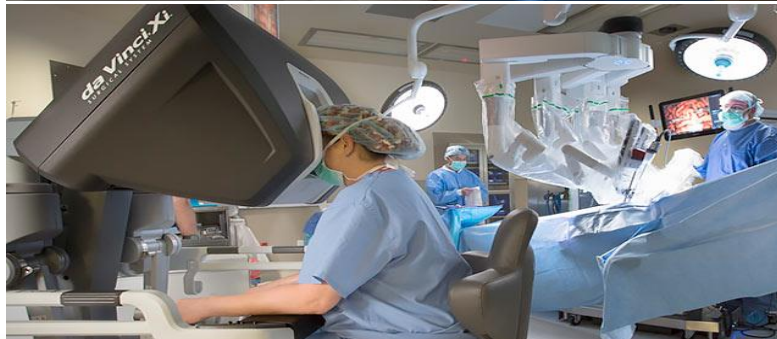


# 06 | TECHNOLOGY- ROBOTICS

Surgical Procedures and Intraoperative Imaging

Phlebotomy

Infection Control

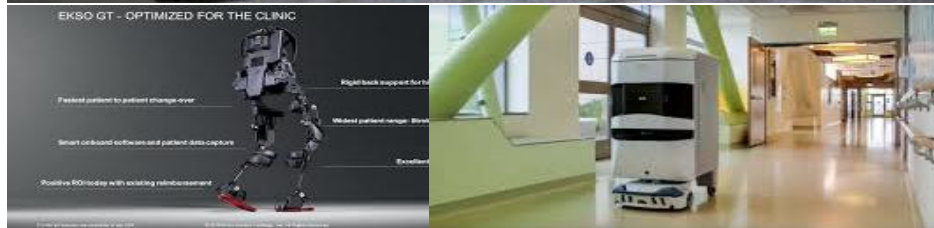




# 07 | TECHNOLOGY- ROBOTICS

Delivery of materials and supplies

Telemedicine





# 08 | TECHNOLOGY- ROBOTICS

## Building Construction



## 09 | TECHNOLOGY- NANO

Drug Delivery

Regeneration

Toxin Removal

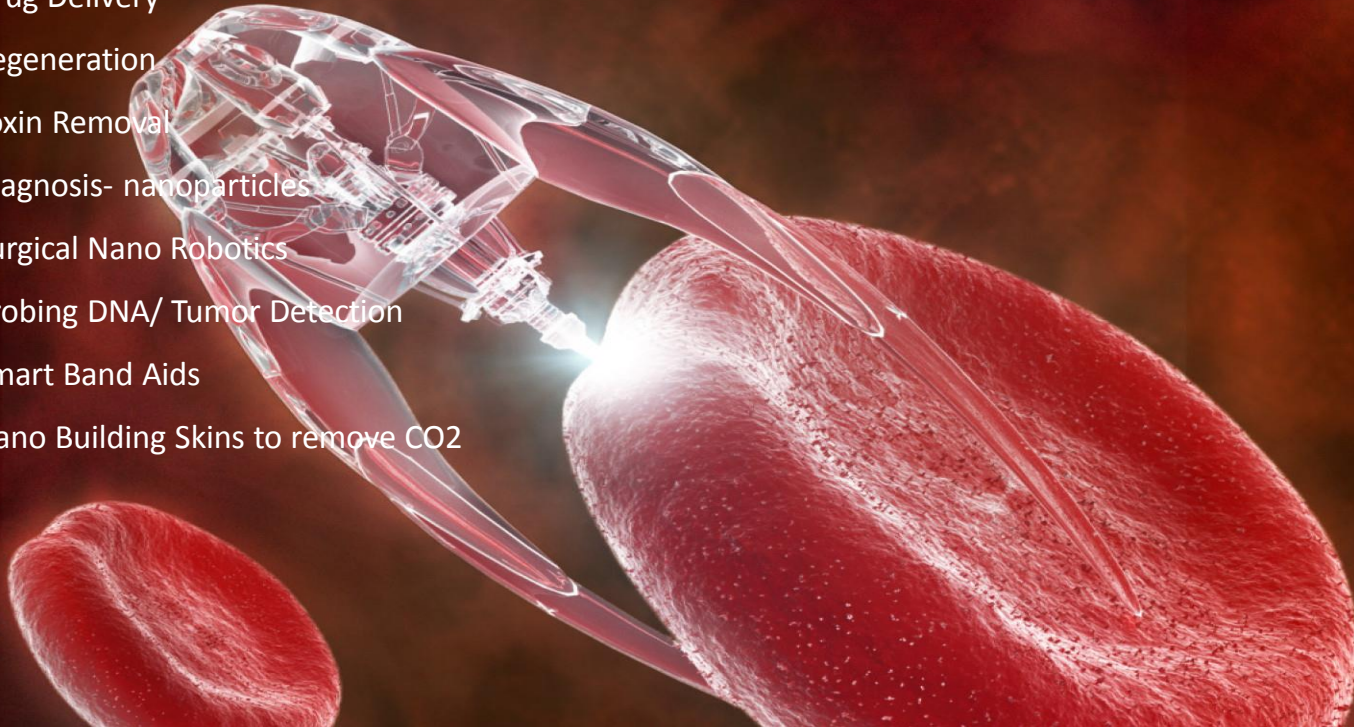
Diagnosis- nanoparticles

Surgical Nano Robotics

Probing DNA/ Tumor Detection

Smart Band Aids

Nano Building Skins to remove CO<sub>2</sub>

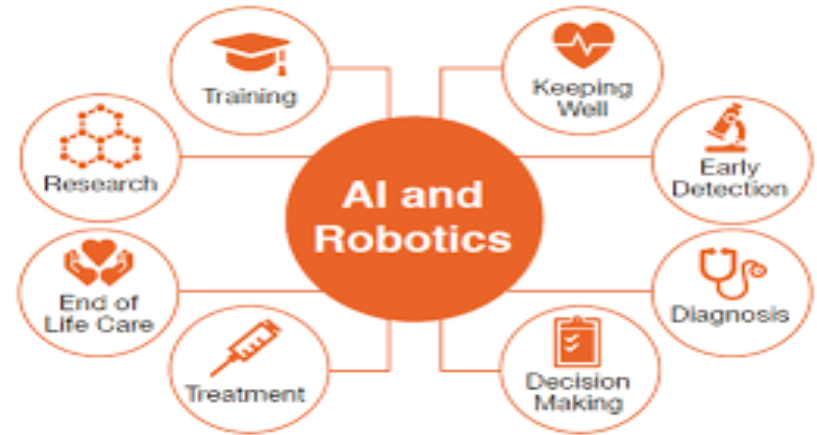


# 10 | TECHNOLOGY- ARTIFICIAL INTELLIGENCE/ MACHINE LEARNING

Big Data Diagnostics

Secure EMR Sharing

Improved Training





# 11 | TECHNOLOGY-VR/AR/IR

Virtual Reality

Augmented Reality

Immersive Reality

Design





## 12 | TECHNOLOGY- MOBILE PLATFORMS/ APPS

Access/ Convenience

Population Care / Management

Training

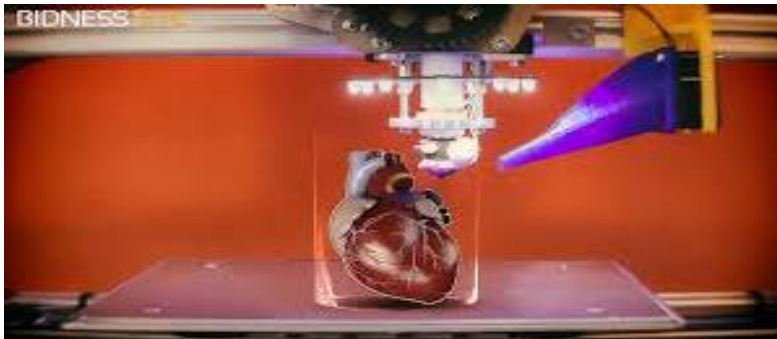


# 13 | TECHNOLOGY- 3D PRINTING

Casts/ Prosthetics

Organs

Digital Fabrication



# 14 | TECHNOLOGY- BUILDING

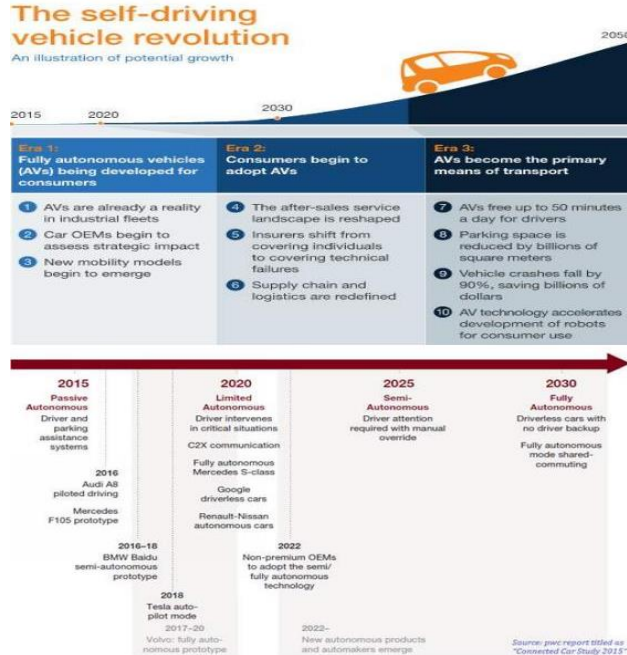
Light Transmitting Concrete  
Regenerative Flooring  
CO2 Skin Removal



# 15 | TECHNOLOGY- AUTONOMOUS VEHICLES

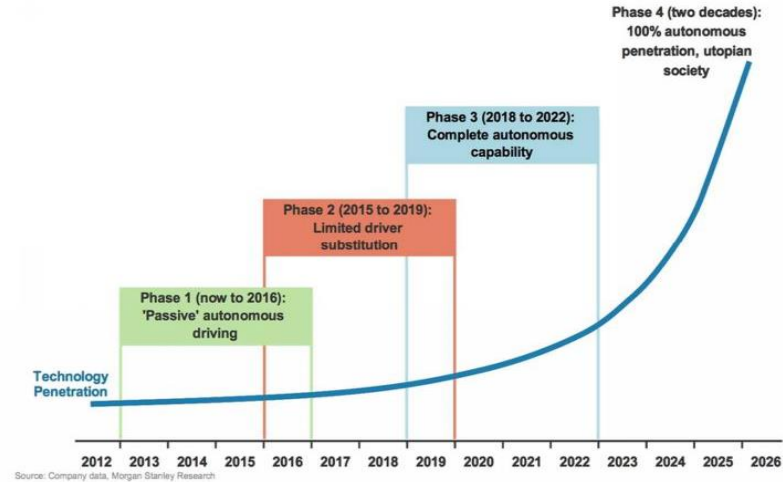


90-95% of a Car's time is spent in Storage



## ADOPTION TIMELINE

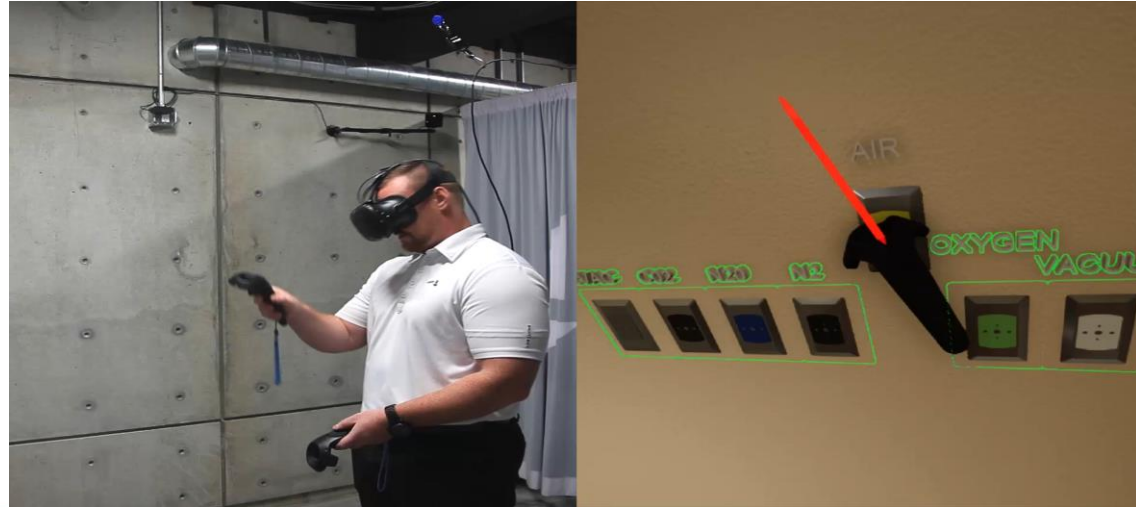
2025 Available - 2030 Common - 2040 Primary





## 16 | TECHNOLOGY- IMPACTS AND RESPONSES

- Increased Life Expectancy and Outcomes
- Improved and Faster Diagnosis
- Expertise and Digital Fab Anywhere
- Mitigate Scarcity
- Automation will Affect Society's Fabric
- Improved Training
- Reduction in Need for Parking
- Land Use Opportunities
- Better Performing Buildings

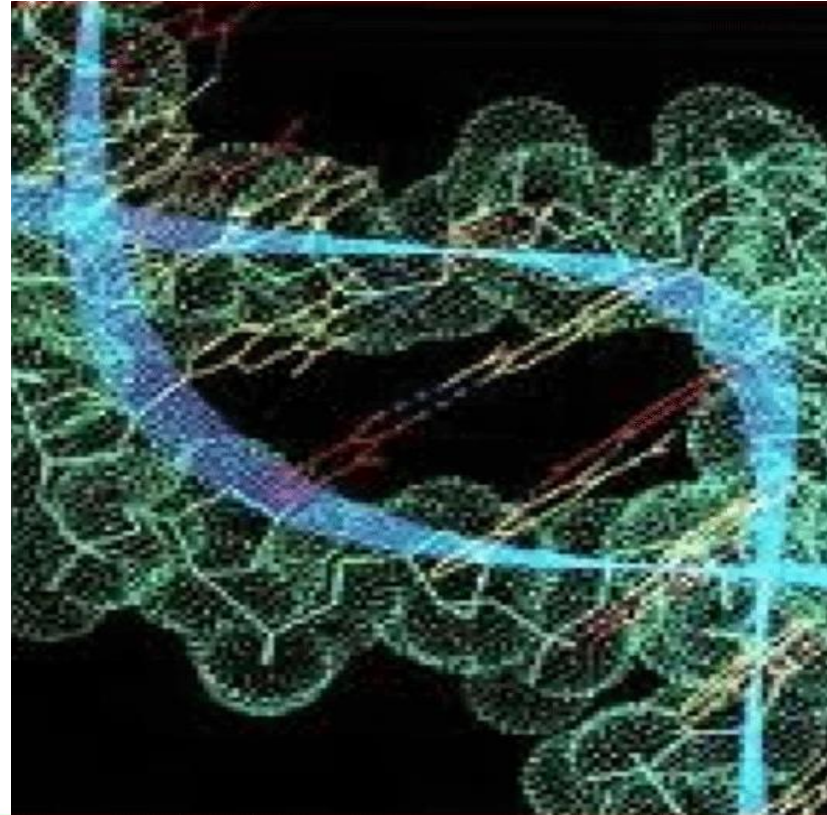


# 17 | SCIENCE TRENDS

Genomics

Bioinformatics

Pharmacogenomics



# 18 | SCIENCE TRENDS- IMPACTS

## Translational

Gene Targeting

CRISPR

Speed to Market  
Pharmaceuticals and Medical Devices

## Clinical

Reduced Clinical Trials

Improved Patient Therapeutic  
Decision Making

Infectious Disease Investigation

## Personalized Medicine

Targeted Drugs

Improved Treatment Plans



# 19 | SCIENCE TRENDS- RESPONSES

## Translational Medicine Facilities

Academia

Healthcare

Research

Incubator

## Genetic Testing and Editing

Personalized Drug Treatment and spaces to support them

DNA testing capability in clinics

CRISPR at Home Testing

## Better Materials

Quantum Dots

Graphene

## Reduction in Energy Costs





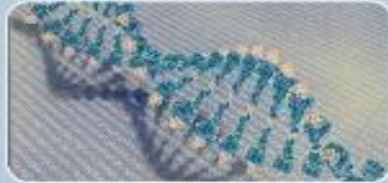
## 20 | CONCLUSION- CONVERGENCE

Convergence of Science and Technology

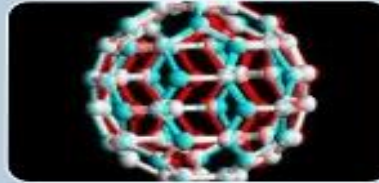
Technology - Mitigate Socio-Cultural Issues

Design to Improve Your Clients Viability

# GENETICS, NANOTECHNOLOGY AND ROBOTICS



The Human Genome Project completed the mapping of all human genes in 2001, which has huge implications in the field of biotechnology and for humanity at large.



Nanotechnology has made possible the introduction of nano-robots or nanobots, which can be used in medicine to diagnose and cure diseases, and even to fix genetic diseases in future.



While robots are still do not possess artificial intelligence in the sense of making autonomous decisions, they are now being built with "symbiotic autonomy", which enables them to ask for help from humans or the Internet, and improve themselves.

Source: <http://www.nature.com/news/robotics-ethics-of-artificial-intelligence-1.17611>

# Building future of healthcare