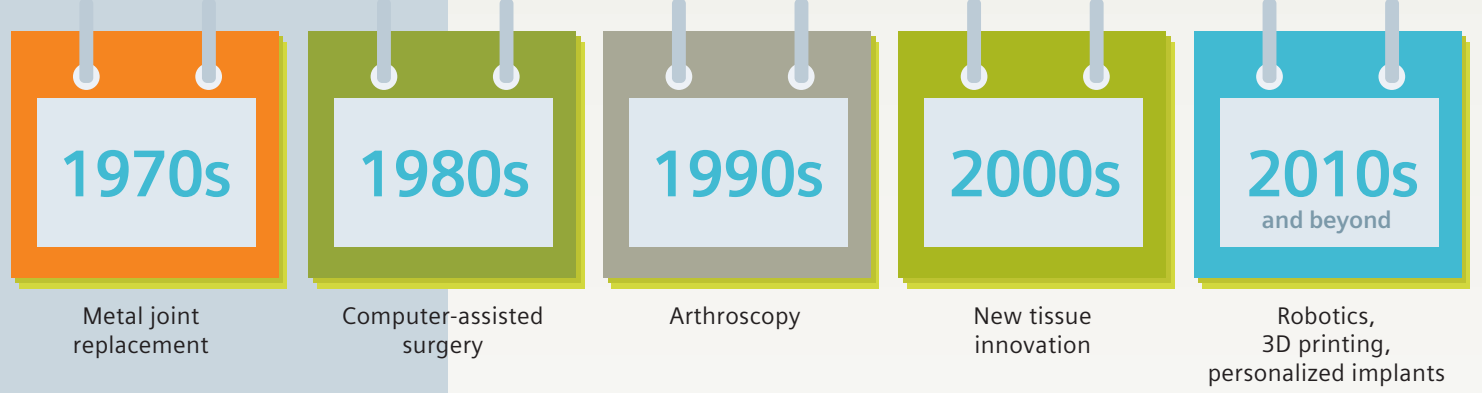


# Automating the image to implant process

## Orthopedic innovations over time

The decade of the 1970s is known for the metal joint replacement, the 1980s computer-assisted surgery, the 1990s the widespread use of arthroscopy, and the 2000s tissue engineering. This decade will likely be known for robotic surgery, distance surgery and virtual reality training, which is already in widespread use in teaching tomorrow's orthopedic surgeons.



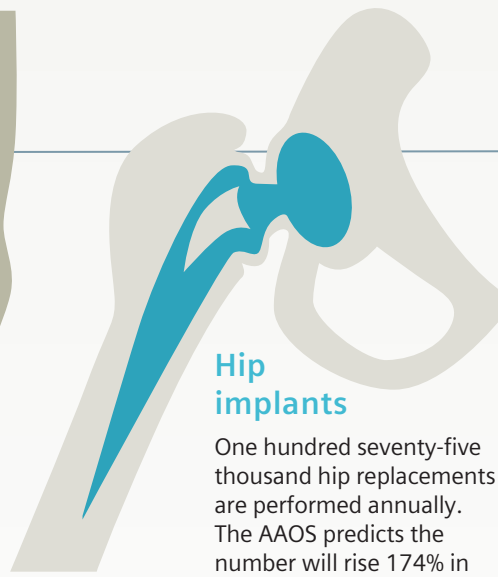
### Knee implants

A half-million knee replacements are performed annually. The American Academy of Orthopaedic Surgeons (AAOS) predicts the number will rise 673% in the next twenty years.



### Hip implants

One hundred seventy-five thousand hip replacements are performed annually. The AAOS predicts the number will rise 174% in the next twenty years.



## Varieties of personalization

### Surgical robots and computer-assisted surgical tools:

- Cutting guides
- Navigation
- Haptic feedback
- Implant placement

### Custom implants:

- Knee
- Hip
- Spinal
- Ankle
- Shoulder
- Maxillofacial

### Spinal implants

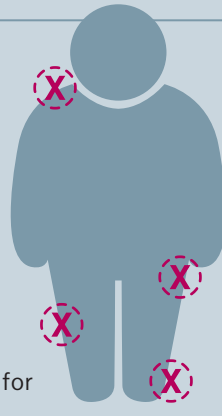


## Why personalization?

### Industry trends:

- Aging demographics, obesity, active lifestyles
- Efficacy of patient outcomes
- More educated consumers
- Differentiation: 6 of the top 10 orthopedic companies are working on personalized products

In 2009 to 2010, over 78 million U.S. adults were obese. – National Center for Health Statistics (NCHS) Data Brief, January, 2010

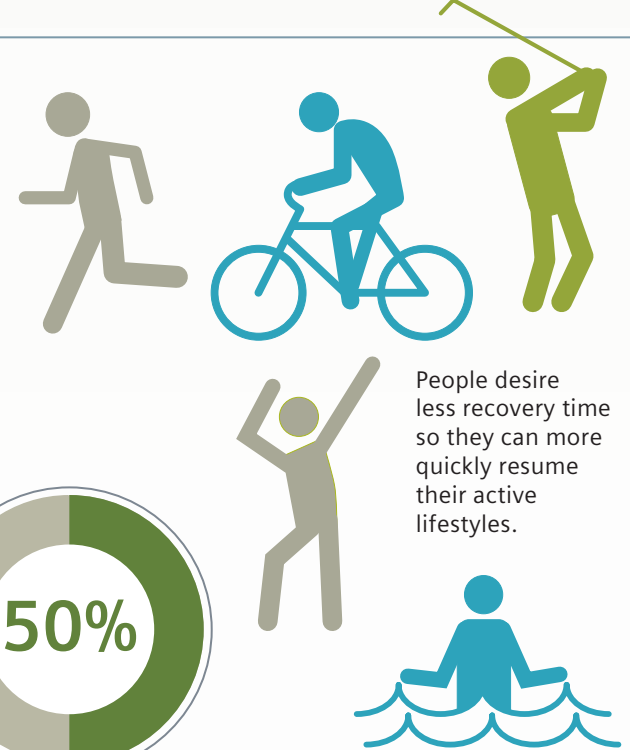


### Aging demographics

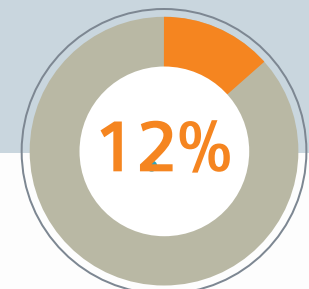


By 2015, those aged 50 and older represented 45% of the U.S. population – American Association of Retired Persons (AARP)

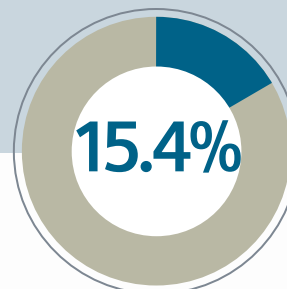
By 2030, the 65-plus population will double to about 71.5 million, and by 2050 it will grow to 86.7 million people – United States Census



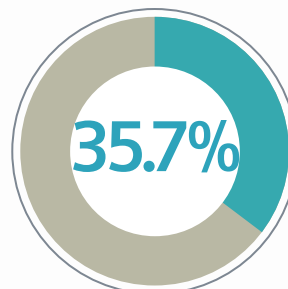
People desire less recovery time so they can more quickly resume their active lifestyles.



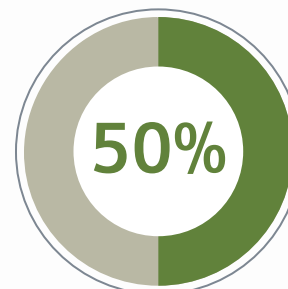
The surgical robotics market is estimated to grow at an annual rate of 12% through 2018, reaching a size of \$18 billion – Alpha Now (Thomson Reuters)



3D printing in medical applications is expected to grow at a significant compound annual growth rate of 15.4% from 2013 to 2019 – Transparency Market Research



In 2009–2010, 35.7% of U.S. adults were obese – National Center for Health Statistics (NCHS) Data Brief, January, 2010



By 2030, more than half of Americans could be obese – Johns Hopkins Health Alert

## Challenges facing orthopedic mass customization

### Speed bumps:

- Manual processes
- Information exchange and collaboration
- Manufacturing and logistics



Improved waste management through better medical waste segregation could reduce operating room surgical waste by over 33% – The Advisory Board Company

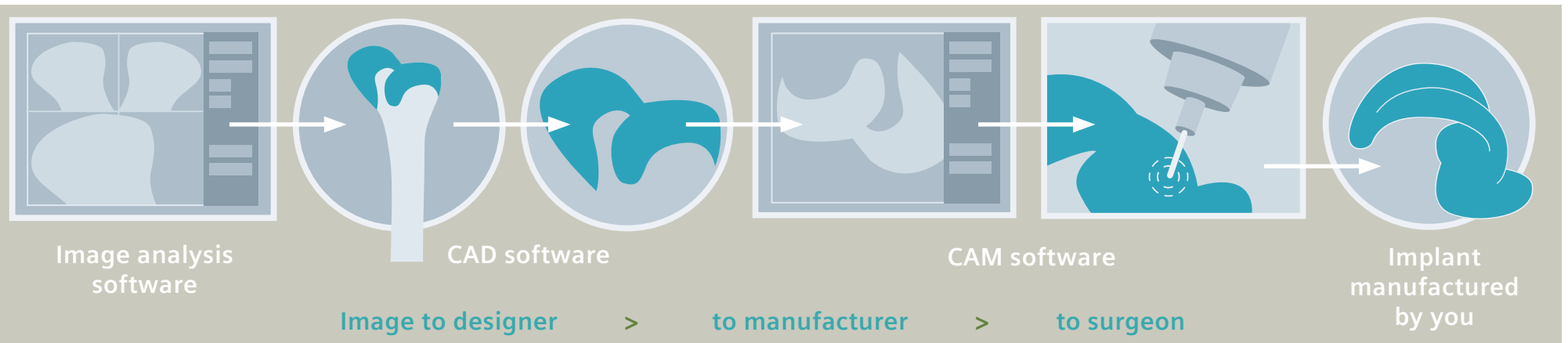
### Accuracy:

- Multiple data formats
- Manufacturing precision
- Validation

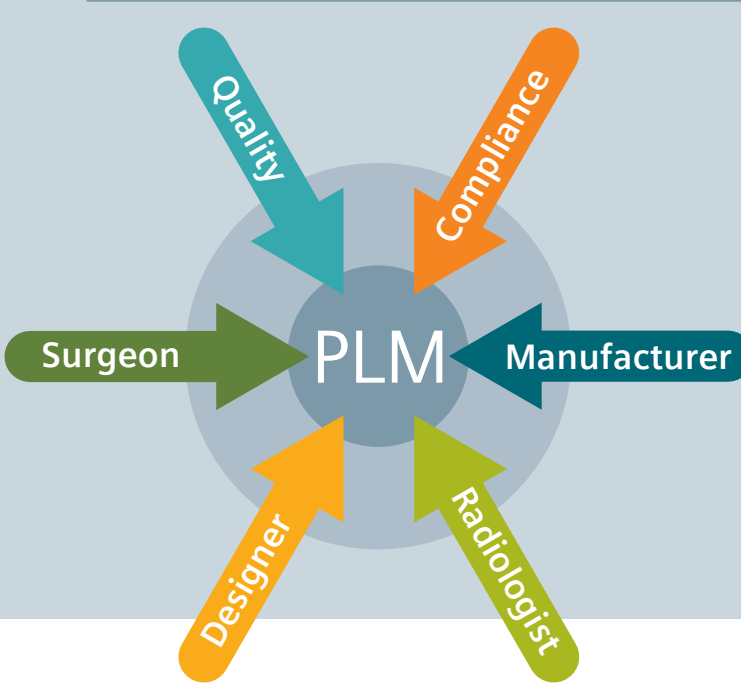


Cutting bone cement use in half could potentially save millions of dollars – The Advisory Board Company

## Siemens answer to challenges



## Benefits of using Siemens PLM Software automation



### Faster:

- Image to CAD in hours
- Complex freeform design
- Manufacture with best-in-class tools
- 3D printing enablement

### More efficient:

- Optimized toolpath programming
- Less waste and better accuracy
- End-to-end collaboration along entire process chain
- Less off-the-shelf inventory



Automation can reduce processes from weeks to hours

Reduced costs and better response time = higher margins



For more information and a demonstration, go to:  
[siemens.com/plm/i2i](http://siemens.com/plm/i2i)