Healthcare-associated infections (HAIs) are acquired while receiving medical care for other conditions in hospitals, physician offices, long-term care facilities, and other healthcare settings. They are largely preventable, yet costly and deadly, and rapidly becoming a national crisis as they increasingly develop resistance to drugs.

### Age – A Major Risk Factor

- Around 45% of hospital-acquired HAIs in 2007 were in patients age 45 and older.
- In 2008, 75% of healthcare-associated invasive MRSA infections occurred in patients older than 50, with 46% in patients older than 65. $20\%$ were in nursing home residents.
- More than 90% of deaths from C. difficile infections occur in people age 65 and older.

### The Human Burden

- Patients with HAIs have a principal diagnosis of sepsis.
- The majority of the 99,000 patients killed by healthcare infections each year are due to antibiotic-resistant pathogens.
- In 2008, only 3% of hospital stays were for sepsis/septicemia, yet they made up 15% of hospital stays with HAIs.
- In 2001, MRSA killed more Americans (~19,000) than were killed by drugs, alcohol, and homicide combined.

### The Added Cost of Drug Resistance

- Of the 99,000 ANNUAL DEATHS from HAIs:
  - 36,567 were from pneumonia.
  - 13,886 from urinary tract infections.
  - 8,325 from surgical site infections.
  - 7,182 from other infections.

- Compared with patients hospitalized with other diagnoses, patients hospitalized for sepsis/septicemia were:
  - 3x more likely to be discharged to long-term care; and
  - 3X more likely to be discharged to long-term care.

### Preventing & Treating HAIs and Lowering Resistance

- Drug-resistant infections (DRIs) increase the length of hospital stays by more than 22%, and the cost by close to 30%.
- The societal costs of antibiotic-resistant infections are around $15.5 billion each year—this includes the costs of lost wages and premature deaths.

### The Unique Burden of Septicemia/Sepsis

- Around 20 of all HAIs are central line-associated bloodstream infections, catheter-associated urinary tract infections, and ventilator-associated pneumonia. Surgical site infections and Clostridium difficile (C. difficile) are also common HAIs.

### The Economic Burden

**The Economic Burden**

- **Drug-resistant infections (DJIs)** increase the length of hospital stays by more than 22%, and the cost by close to 30%.
- **DJI** cost the U.S. healthcare system between $16.6 billion and $26 billion in extra costs each year.
- The societal costs of antibiotic-resistant infections are around $15.5 billion each year—this includes the costs of lost wages and premature deaths.
- As an example, the median treatment cost for MRSA patients over a six month period was 118% higher than the cost of treating drug-susceptible MRSA strains.
- Between 2001 and 2010, vaccine use prevented an estimated 8,205 deaths, and saved an estimated $1.8 million in medical costs.  A 70% reduction would lead to a savings of up to $31.5 billion (Standiford 2012).
- Of the 40% of hospital stays that use antibiotics, 19% believe those infections to be on the rise.

**Total Annual Direct Cost of HAIs**

- **$28.4 to $45 BILLION**

**Hospitalized Elderly Patients More Likely to Develop a HAI than Younger Patients**

- Around 1 in 20 hospitalized elderly patients will contract a HAI.
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- 1 in 10 patients aged greater than 65. (American Hospital Association 2010)
- More than 90% of deaths from C. difficile infections occur in people age 65 and older.

### Rising Resistance

- $70\%$ of hospital-acquired HAIs are resistant to at least one antibiotic.

- Resistance of Klebsiella pneumoniae to antibiotics has dramatically increased—from 5.3% to 11.6% for third generation cephalosporins (between 1999 and 2010), and from 0% to 4% for carbapenems (between 2001 and 2010).
- High-level penicillin-resistant Streptococcus pneumoniae increased 1.8-fold every 17 years.

- In 2007, 1 in 10 hospital stays with HAIs have a principal diagnosis of sepsis.
- In 2008, 75% of healthcare-associated invasive MRSA infections occurred in patients older than 50, with 46% in patients older than 65.
- More than 90% of deaths from C. difficile infections occur in people age 65 and older.

### The Value of Innovation

**Preventing & Treating HAIs and Lowering Resistance**

- Practices that lead to a 20% reduction in preventable hospital-acquired HAIs would save up to $6.8 billion in medical costs. A 10% reduction would lead to a savings of up to $3.1 billion (Towse 2011).
- A multidrug-resistant infection control program reduced the rate of hospital-acquired HAIs by more than 30% and improved quality of care and patient outcomes.
- Standardization of best practice interventions reduced central line-associated bloodstream infections and saved an estimated 1,886 lives and $360 million.
- 8,205 lives and saved an estimated $310 million in direct medical costs each year.
- An antibiotic stewardship program saved a total of $1 million in the first year after discontinuation.
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### Losing Ground

**Total Number of New AntiBacterial Agents**

- **2009-2012**

### The Silver Book: Healthcare-Associated Infections

- Healthcare-associated infections (HAIs) are acquired while receiving medical or surgical care for other conditions in hospitals, physician offices, long-term care facilities, and other healthcare settings. They are largely preventable, yet costly and deadly, and rapidly becoming a national crisis as they increasingly develop resistance to drugs.

- Nearly 30% of all hospital-acquired infections occur outside of the intensive care unit (ICU).

- In 2008, 75% of hospital-acquired HAIs were in patients age 65 and older, $20\%$ were in nursing home residents.
- More than 90% of deaths from C. difficile infections occur in people age 65 and older.
- The rate of hospitalization for sepsis/septicemia was 10 times higher for patients age 85+ than for those under the age of 40.
- Patients with HAIs cost, on average, $43,000 more than those without an infection per hospital stay.
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- Antibacterial-resistant pathogens are responsible for an estimated 19,000 deaths and an estimated $1.8 billion in healthcare costs, each year.
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- Around 20 of all HAIs are central line-associated bloodstream infections, catheter-associated urinary tract infections, and ventilator-associated pneumonia. Surgical site infections and Clostridium difficile (C. difficile) are also common HAIs.
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