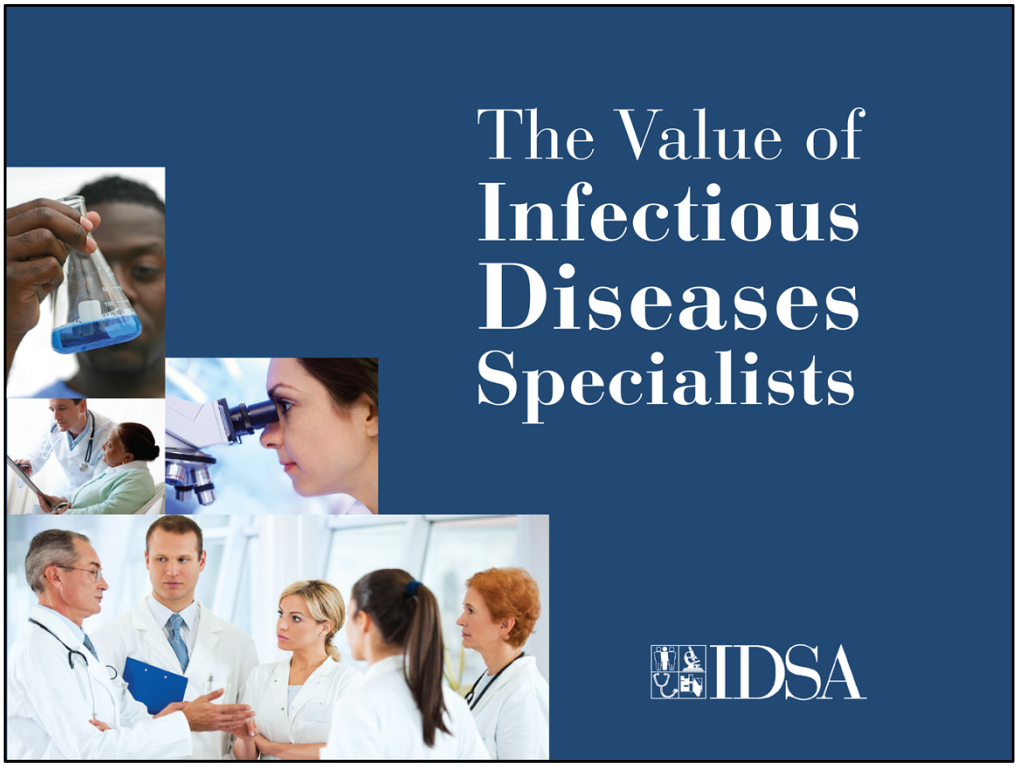
The Value of
Infectious
Diseases
Specialists
IDSA

Value is central to reform

Conversation in health care reform is focused on
Value

Critical questions:

- What value does each specialty contribute?
- Can specialty care actually bend the cost curve?

$$\text{Value} = \frac{\text{Quality}}{\text{Cost}}$$

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At the national level and the local level, the ongoing conversation in health care reform is focused on “value,” raising several critical questions:

What’s the value of specialty care?
Can specialty care bend the cost curve?

Recognizing the this drive towards value-based health care, where quality is assessed relative to cost, as well as highlighting the importance of team-based care, we raised the question: What is the value of infectious diseases (ID) specialists?

Evidence for ID Value

- Link between ID interventions and positive patient outcomes.*
- When the attending physician follows ID recommendations:
  - Patients are more often correctly diagnosed
  - Have shorter length of stays
  - Have fewer complications
  - Use antibiotics more judiciously

* See supporting literature cited in Schmitt et al. Infectious Diseases Specialty Intervention Is Associated With Decreased Mortality and Lower Healthcare Costs. Clin Infect Dis. (2013) doi: 10.1093/cid/cit610 First published online: September 25, 2013

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The link between ID interventions and positive patient outcomes has been established.

From previous research, we know that when the advice given in an ID consult is followed, patients are more correctly diagnosed, have shorter LOS, and are treated with more judicious use of antibiotics than when it is not followed.

Objective of New Research: Proof of Value

- To generate more robust data regarding the impact of ID consultation using a national claims database
- Outcomes significant in the health care reform conversation
  - Mortality
  - Readmission rate
  - Length of stay
  - Resource utilization

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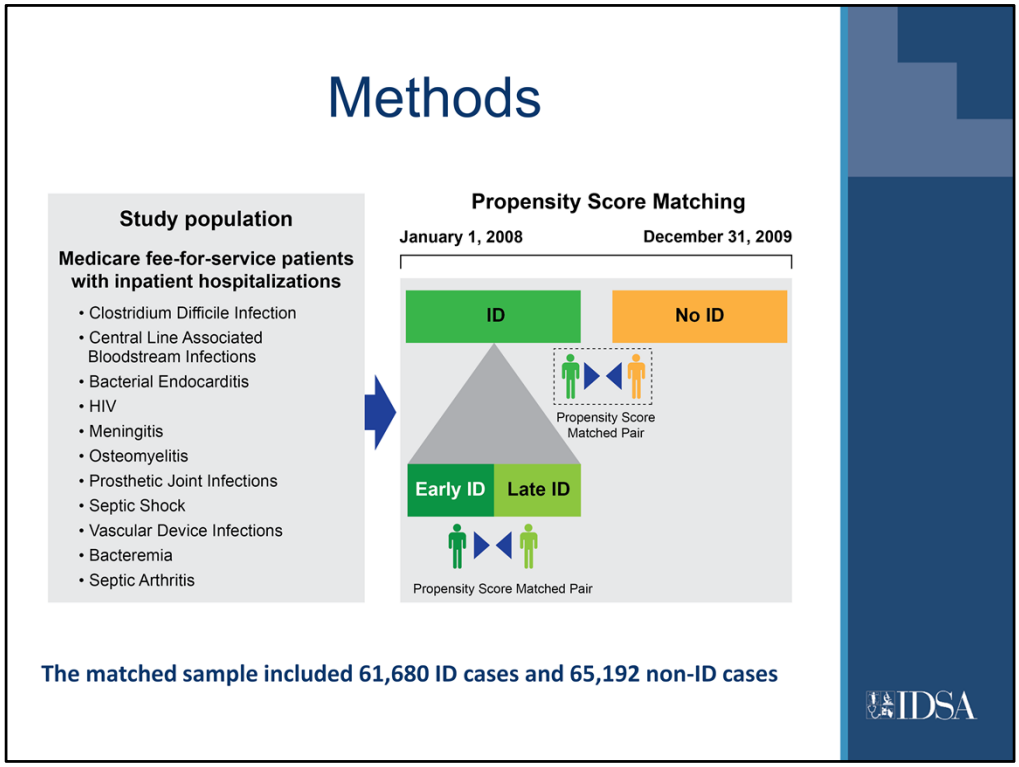
Prior studies are based on small samples sizes and chart reviews, which constrain the results from being more generalizable. In addition, many of these studies focused on only one infection (i.e. Staph Aureus) rather than a collection of infectious diseases that are seen in hospitals. Therefore, it is difficult for payers, hospitals and consumers to draw meaningful conclusions about the value of ID specialty.

IDSA, the professional specialty society for Infectious Diseases physicians, funded a large study with the intent of exploring the relationship between ID involvement in the inpatient setting with outcome measures such as mortality and costs. This study aimed to explore the link between ID involvement on meaningful outcome measures, namely mortality, readmissions, LOS, and costs, using a national claims database.



Using a 35% sample of the Medicare Claims database, we looked at cases in which the patient had at least one of eleven infections. These cases were then stratified on the basis of whether or not they had an ID consult in the inpatient setting. Cases from these two cohorts were then paired by applying the Propensity Score Matching methodology, netting over 130,000 patient cases.

As a sub-analysis, those cases that had an ID consult were further stratified on the basis of when the ID consult took place. Those that occurred within the first two days of admission were considered “Early,” those that happened later were considered “Late.”

Results: NO ID vs ID

Outcome	No ID	ID	p-Value	OR/%Δ (95% CI)
Index stay length of stay	9.5	9.6	0.001	1.3% (+0.5% – +2.1%)
Index stay ICU days [a]	6.7	6.4	<0.001	-3.7% (-5.5% – -1.9%)
Index stay mortality (%)	10.7	9.8	<0.001	0.87 (0.83 – 0.91)
30-day mortality (%) [b]	8.7	7.7	<0.001	0.86 (0.82 – 0.90)
30-day readmission rate (%) [b]	22.7	22.1	0.009	0.96 (0.93 – 0.99)
Medicare payments to ACH for index stay	$15,850	$15,799	0.435	-0.3% (-1.1% – +0.5%)
Medicare payments for index stay	$18,017	$18,076	0.397	+0.3% (-0.4% – +1.1%)
Medicare payments for 30-day episode [b]	$7,706	$7,858	0.069	+2.0% (-0.2% – +4.1%)

Abbreviations: ICU, Intensive Care Unit; ACH, Acute care hospital; PAC, Post acute care; OR, odds ratio; %Δ, percent difference.
[a] Only patients with one or more ICU days.
[b] Excludes patients expiring in the hospital.

"Having an ID Specialist involved in the care of a patient with a severe infection will lead to better outcomes"

IDSA

THE RESULTS WERE STRIKING:
We found statistically significant differences between those cases that involved ID versus those that did not with respect to days in ICU, Mortality (both in hospital and at 30-days), and 30-day readmissions.

Based on these results, we posit that "Having an ID Specialist involved in the care of a patient with severe infection will lead to better outcomes."

Results: "Early" vs "Late"

Outcome	Early	Late	p-Value	OR/%Δ (95% CI)
Index stay length of stay	13.2	13.8	<0.001	-3.8% (-4.8% – -2.9%)
Index stay ICU days [a]	7.6	8.1	<0.001	-5.1% (-7.7% – -2.4%)
Index stay mortality (%)	7.1	7.5	0.122	0.94 (0.88 – 1.02)
30-day mortality (%) [b]	8.6%	9.6	<0.001	0.87 (0.82 – 0.93)
30-day readmission rate (%) [b]	24.6	26.1	<0.001	0.92 (0.89 – 0.96)
Medicare payments to ACH for index stay	$18,111	$18,728	<0.001	-3.3% (-4.3% – -2.3%)
Medicare payments for index stay	$21,453	$22,207	<0.001	-3.4% (-4.3% – -2.5%)
Medicare payments for 30-day episode [b]	$8,739	$9,318	<0.001	-6.2% (-8.8% – -3.5%)

Abbreviations: ICU, Intensive Care Unit; ACH, Acute care hospital; PAC, Post acute care; OR, odds ratio; %Δ, percent difference.
[a] Only patients with one or more ICU days.
[b] Excludes patients expiring in the hospital.

"Early involvement of an ID Specialist in the care of patients with severe infection will lead to better outcomes with lower costs"

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Results from the Early versus Late sub-analysis showed statistically significant differences in Length of Stay (LOS), ICU days, 30-day Mortality, re-admissions, and overall costs.

Therefore, we propose that "Early involvement of an ID Specialist in the care of a patient with severe infection will lead to better outcomes at lower costs."

Limitations

- Measuring hospital mortality may overstate the impact of ID intervention on mortality
- Unobserved reasons for selection of patients to receive an ID intervention may confound the results
- The PSM methodology excludes some of the sickest people in the ID intervention group, because they had no matches from the non-ID intervention group (patients who were too dissimilar were not included in the analysis)
  - The results therefore may not fully reflect the impact of ID interventions, since it did not take the care for these severe cases into account

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We present the results of our analysis noting several limitations. First, measuring mortality from claims-based data may overstate the role of the ID intervention on that outcome. As well, there may have been unobserved reasons (due to lack of granularity in claims-based datasets) to explain selection of patients to receive an ID intervention.

One interesting limitation is that the PSM methodology excluded some of the sickest patients in the ID cohort as there were no patient cases in the No ID cohort with which to be matched. As noted, the results of this analysis may not fully reflect the impact of ID interventions on the sickest patients.

Implications

- **ID** involvement leads to improved patient outcomes AND **Early ID** interventions result in improved outcomes and reduced costs
  - Patients seen by an ID specialist are
    - 9% less likely to die in the hospital
    - 12% less likely to die post-discharge
    - Spend 3.7 % less time in the ICU
- These results suggest a critical role for ID consults for select, severe infections
- Consider these results in light of current core measures such as "all-cause" mortality, pneumonia, CLABSI, and CAUTI

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This research should prompt a discussion as to how to improve team-based care coordination of patients with infections frequently encountered here at our institution. We believe these results make a case for promoting early involvement of ID specialists for select, severe infections.

Other areas where ID can add value

- ID specialist-led Antimicrobial Stewardship and Diagnostic Stewardship
- Transitions of care for complex infections
- Outpatient Parenteral Antimicrobial Therapy (OPAT)
- Employee health
- Resource management and Microbiology laboratory oversight

IDSA

Besides providing timely (early) consults in the inpatient setting, there are other activities in which ID can add value.

- Through implementation of an ID-led Antimicrobial Stewardship Program, both costs and antibiotic resistance can be curtailed by applying more judicious use of antimicrobials.

- ID Specialists can also provide oversight to the appropriate use of diagnostic tests.

- ID specialists can provide leadership in infection control & prevention programs and Comprehensive Unit-based Safety Programs (CUSP).

- ID specialists can effectively manage improved care transitions through timely discharge where patients can be treated in the outpatient setting in a cost-effective manner that may promote patient satisfaction.

Innovation by collaboration on value

- Gain-sharing agreements
- Co-management services agreements

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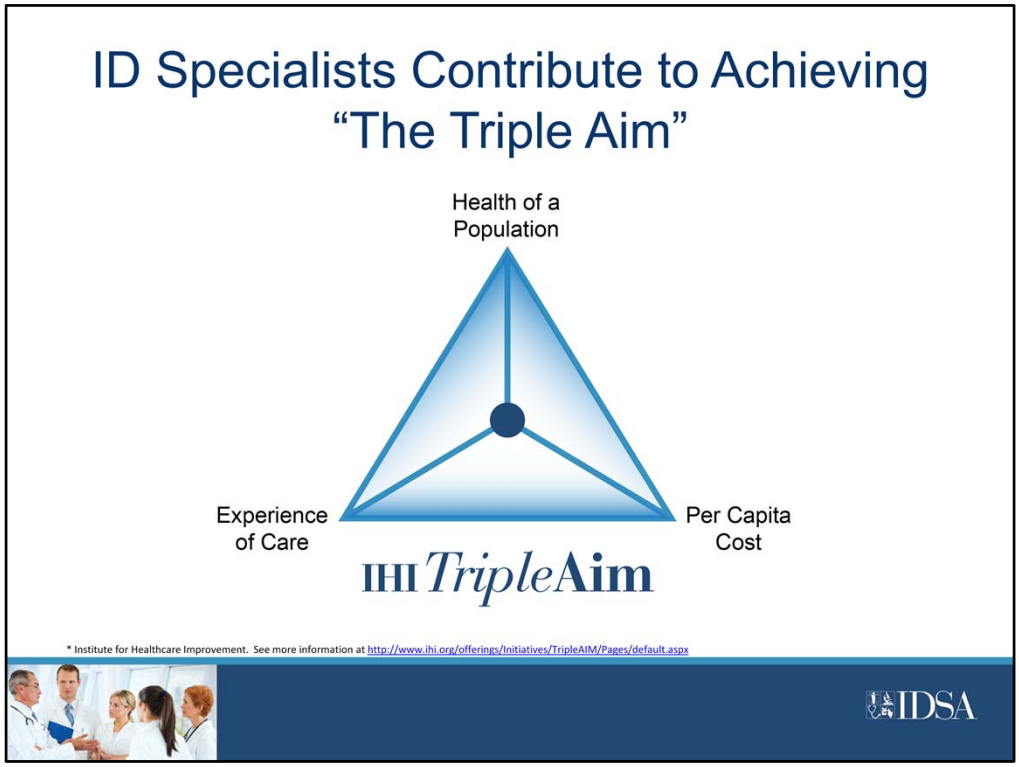
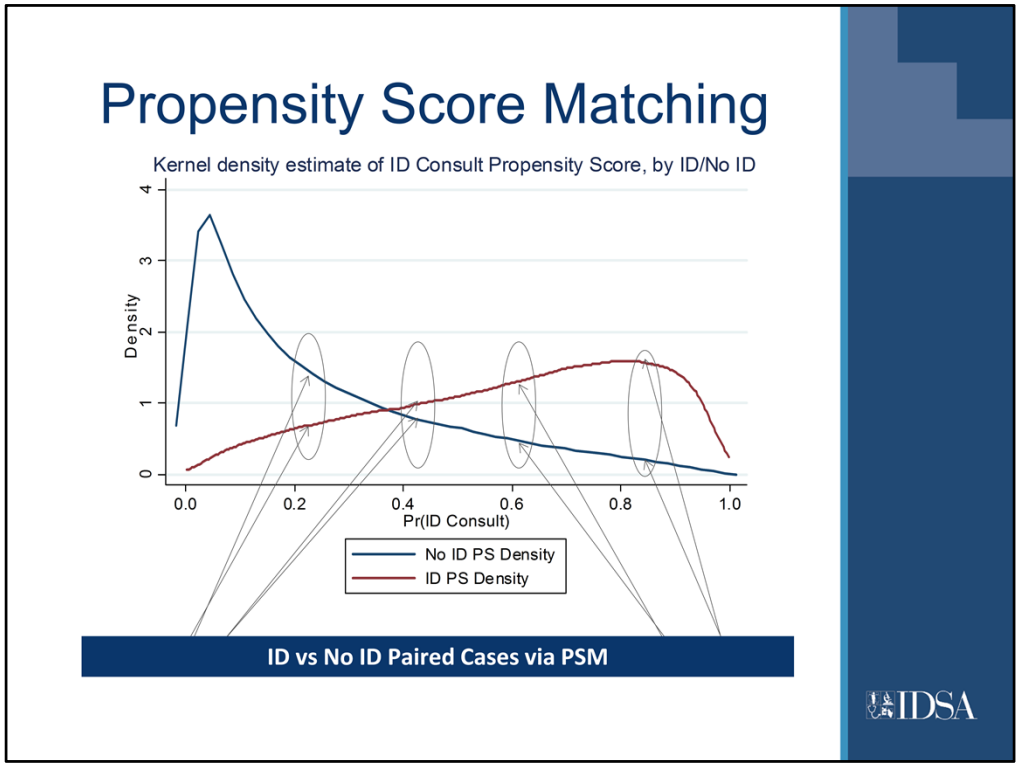
Many of these ID Specialist-led programs and services can be established through innovative payment models such as gain-sharing agreements and co-management services agreements.

I am happy to discuss those in further detail, if you are interested.

Back-Up Slides



Within health care, there has been an ongoing effort to improve the individual patient's experience of care, to improve the health of populations, and to do so in a way that reduces costs. This has been referred to as the "Triple Aim," as first set forth by the Institute for Healthcare Improvement. ID specialists contribute to achieving this "Triple Aim" and we look forward to collaborating with you, our colleagues, through better care coordination and more efficient delivery of health care.



To delve just a little bit deeper into the methodology, once the cases were divided into ID vs NO ID cohorts, each case from one cohort was matched to a case in the other cohort based on the individual case's propensity score, which is an indication of the likelihood of a patient receiving an ID consult.

Steps to performing PSM involve:

- Establish similar groups of patients based on identifiable risk factors
- Construct matched sample of patients that saw an ID specialist and those who did not based on these characteristics. Groups of subjects with similar propensity scores can then be compared, as they are expected to have similar values of the characteristics or variables that could be confounding
- Use multivariate regression to control for expected differences caused by variables that have been shown to influence outcomes unrelated to physician specialty

(confounding variables)

ID plays a leading role in health care systems

- **Core measures such as pneumonia, CLABSI, CAUTI**- maximize reimbursement and save lives!
- **Antimicrobial stewardship programs** - reduce drug costs and curtail resistance!
- **Infection prevention** - save lives and reduce costs!
- **Care transitions** - right diagnosis, right drugs, effective follow-up in outpatient parenteral antibiotic programs.

IDSA

In addition to providing timely (early) consults in the inpatient setting, there are other activities in which ID can add value.

- Through implementation of an ID-led Antimicrobial Stewardship Program, both costs and antibiotic resistance can be curtailed by applying more judicious use of antimicrobials.

- ID specialists can provide leadership in infection control & prevention programs.

- ID specialists can effectively manage improved care transitions through timely discharge where patients can be treated in the outpatient setting in a cost-effective manner that may promote patient satisfaction