2894. Metrics of Antimicrobial Use Within Inpatient Settings: Impacts of Statistical Methods and Case-Mix Adjustments

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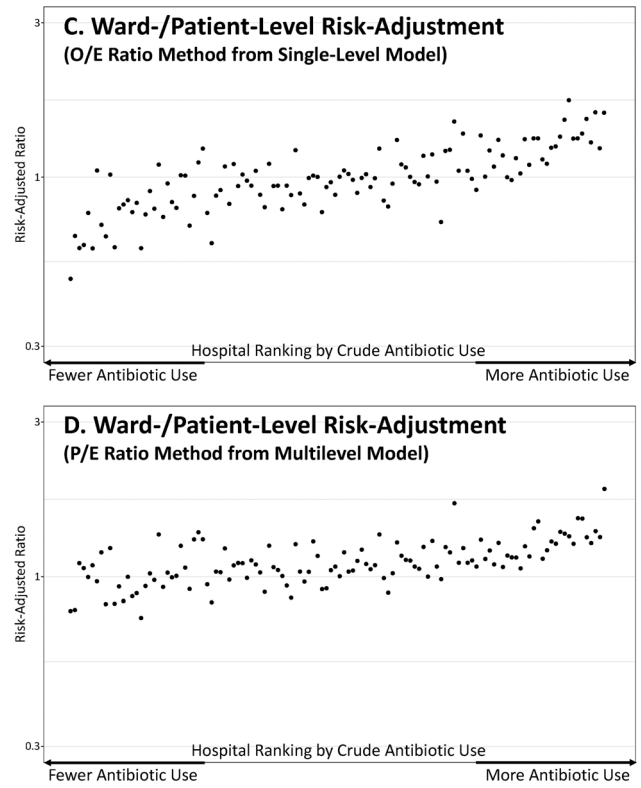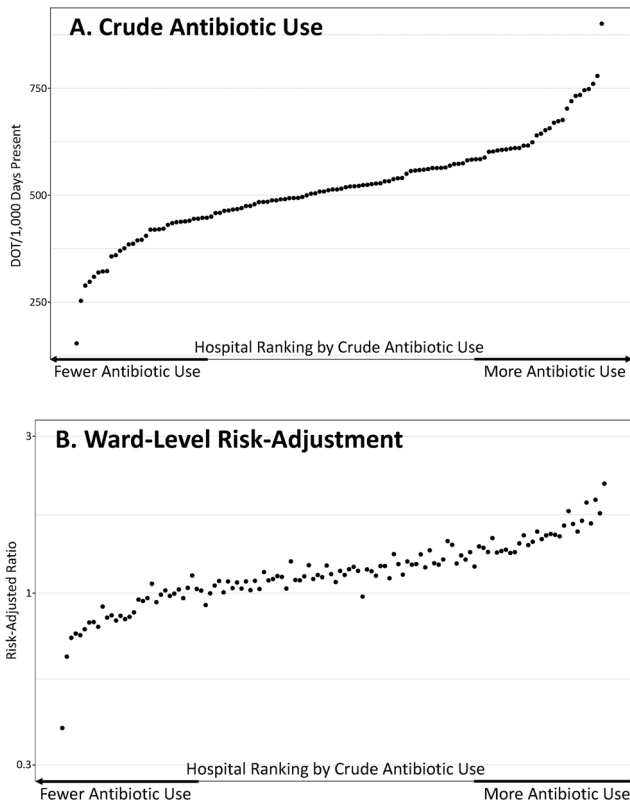
Session: 309. Glass Half Full or Half Empty? Trends in Antimicrobial Prescribing
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Background. The necessary data elements and optimal statistical methods for benchmarking hospital-level antimicrobial use are still being debated. We aimed to describe the relative influence of case-mix adjustment and different statistical methods when ranking hospitals on antimicrobial use (AU) within inpatient settings.

Methods. Using administrative data from the Veterans Health Administration (VHA) system in October 2016, we calculated total antimicrobial days of therapy (DOT) and days present according to the National Healthcare Safety Network (NHSN) protocol. Patient-level demographics, comorbidities, and recent procedures were used for case-mix adjustments. We compared hospital rankings across 4 different methods: (A) crude antimicrobial DOT per 1,000 days present, aggregated at the hospital-level; (B) observed/expected (O/E) AU ratio with risk adjustment for ward-level variables (analogous to NHSN's Standardized Antimicrobial Administration Ratio); (C) O/E AU ratio with risk adjustment for ward-/patient-level variables; (D) predicted/expected (P/E) AU ratio with risk adjustment for ward-/patient-level variables, based on a multilevel model accounting for clustering effects at hospital- and ward-levels.

Results. The cohort included 165,949 DOTs and 318,321 days present at 122 acute care hospitals within VHA. Crude DOTs per 1,000 days present ranged from 153.6 to 900.8 (Figure A), and ward-level risk adjustment only modestly changed rankings (Figure B). When adjusted for ward- and patient-level variables (including demographics, 14 comorbidities and 22 procedures), rankings changed substantially (Figure C). Risk-adjustment by a multilevel model changed rankings even further, while shrinking variabilities (Figure D). Ten hospitals in the lowest and 11 hospitals in the highest quartiles by O/E risk adjustment for only ward-level variables were classified to different quartiles on P/E risk adjustment.

Conclusion. We observed that the selection of variables and statistical methods for case-mix adjustment had a substantial impact on hospital rankings for antimicrobial use within inpatient settings. Careful consideration of methodologies is warranted when providing benchmarking metrics for hospitals.

A. Crude Antibiotic Use

B. Ward-Level Risk-Adjustment

C. Ward-/Patient-Level Risk-Adjustment
(O/E Ratio Method from Single-Level Model)

D. Ward-/Patient-Level Risk-Adjustment
(P/E Ratio Method from Multilevel Model)

Disclosures. **All Authors:** No reported Disclosures.

2895. Threats to Successful Elimination of Viral Hepatitis: Results from the Nationwide Treatment as Prevention for Hepatitis C (TraP HepC) Program in Iceland

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Session: 310. Hepatitis C: Progress on Elimination and Treatment
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Background. The main driver of the Hepatitis C virus (HCV) epidemic in most western countries is injection drug use (IDU) among people who inject drugs (PWID). Iceland has provided unrestricted access to direct-acting antiviral agents (DAA) to all HCV-infected patients in the country covered by national health insurance, by a program entitled Treatment as Prevention for Hepatitis C (TraP HepC) from 2016 and is on track to become among the first to achieve the WHO goals of eliminating HCV as a public health threat.

Methods. We analyzed data regarding testing for HCV, incidence of IDU, prevalence of HCV viremia among PWID, drug use in the community and trends in homelessness prior to and during the first 24 months of TraP HepC to monitor outcomes and identify new or persistent challenges.

Results. Intensity of nationwide testing for HCV increased by 22% in 2016, 60% in 2017, and 81% in 2018 compared with previous years ($P < 0.001$). During 2016–2018 the incidence of new injection drug use, as surveyed among those admitted for addiction treatment increased by 48%. The total number of PWID admitted annually with HCV viremia however remained relatively stable during the entire period (2010–2018). The prevalence of HCV viremia among people recently injecting drugs admitted for addiction treatment however dropped from 48.7% to 16.2% in 2017, and to 10.2% in 2018 ($P < 0.001$). Analysis of data regarding stimulant use, as measured by drug levels in wastewater shows an almost threefold increase of amphetamine and an eightfold increase in cocaine levels during 2016–2018 compared with 2015. Concurrently, the number of homeless has doubled. Two years into TraP HepC > 80% of the estimated total HCV-infected population were started on their first course of DAAs. By intention to treat analysis, the cure rate was 92.4% among patients without history of IDU in the past 6 months, compared with 82.9% among active IDU ($P = 0.0006$); those with history of recent IDU were more likely to discontinue ($P < 0.0001$). Homelessness carried the highest relative risk (RR) of treatment failure (RR = 2.4, $P = 0.008$), mostly due to discontinuation.

Conclusion. Iceland is on track to eliminate HCV, but challenges such as increasing drug use in the community and homelessness need to continuously monitored and addressed; they may jeopardize the success of elimination efforts.

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2896. Reduction in Liver-related Mortality Among HCV Infected Persons Is Driven by Attainment of SVR Independent of the Regimen Used: Results from the ERCHIVES Cohort

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Background. Beneficial effect of hepatitis C virus (HCV) treatment with directly acting antiviral agents (DAAs) upon overall mortality is well-established. However, the effect of treatment upon liver-related mortality is not well documented.

Methods. We used ERCHIVES database to identify all chronic HCV-infected persons between January 1, 2002 and December 31, 2016. We excluded those with HIV or HBV coinfection or hepatocellular carcinoma. HCV treatment status was defined as prescription of pegylated interferon (PEG)/ribavirin (RBV) for >24 weeks, PEG/RBV plus boceprevir or telaprevir, or a newer DAA regimen for >8 weeks. Propensity score-matched untreated controls were identified for each treated person. We linked HCV+ cases to the National Death Index (NDI) data updated to the end of 2016. Cause of death was retrieved from the underlying cause listed on the death certificate by using ICD-10 codes. The listed primary cause was assigned as the cause of death. Each cause of death was categorized as "Liver related" or "Not liver related" by two physician members of the study team. Liver-related causes included viral hepatitis-related causes, complications of liver disease, and hepatocellular carcinoma, but excluded any cause where alcohol or any other known liver disease other than viral hepatitis was specified. Discordant results were adjudicated by a third physician member.

Results. Among 34,412 treated and 21,287 untreated controls, there were 13,098 deaths, of which 2,474 (18.9%) were liver related. Overall liver-related mortality rate per 100 person-years of follow-up was 0.64 in the treated and 1.24 in the untreated group (P). Among the treated group, the liver-related mortality rate per 100 person-years was 0.14 for those who achieved SVR and 1.26 among those who did not achieve SVR. When stratified by treatment regimen, those treated with PG/RBV had a mortality rate of 0.73 vs. 0.24 for those treated with a DAA regimen. However, further stratification by attainment of SVR revealed that the difference between regimens was almost entirely driven by the difference in SVR rates (see table).

Conclusion. HCV-infected persons who receive treatment have a substantial reduction in liver-related mortality. This reduction is largely driven by attainment of SVR and is independent of the regimen use when stratified by SVR attainment.

Table. Liver related mortality rate per 100 person-years of follow up.

	Number of deaths	Rate/100 person-years	P-value*
Overall			
Group A: HCV+ treated	825	0.64	--
Group B: HCV+ untreated	1649	1.24	<.0001
Among those treated			
By treatment response			
SVR achieved	111	0.14	--
SVR not achieved	714	1.26	<.0001
By treatment regimen			
PEG/RBV	735	0.73	--
DAA	72	0.24	<.0001
By treatment regimen and SVR			
PEG/RBV SVR achieved	68	0.13	--
PEG/RBV SVR not achieved	667	1.3	<.0001
DAA SVR achieved	40	0.14	0.01
DAA SVR not achieved	32	0.53	<.0001

Disclosures. **All Authors:** No reported Disclosures.

2897. Collocated Buprenorphine Is Associated with Improved HCV Visit Adherence in People Who Inject Drugs (PWID): Data From the ANCHOR Study

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Background. Engaging PWID in HCV treatment and monitoring for reinfection is critical to eliminate HCV and improve health in people who use drugs. However, PWID are often marginalized and can be difficult to engage and retain in care. The collocation of HCV treatment with buprenorphine to treat opioid use disorder (OUD) may improve visit adherence in this population.

Methods. ANCHOR is a single-center study evaluating treatment of HCV in PWID with chronic HCV, OUD, and IDU. Participants receive sofosbuvir/velpatasvir x12 weeks and are offered collocated buprenorphine. HCV visits occur at weeks 4, 12, 24, 48, 72 and 96.

Results. At screening, the 100 enrolled patients were predominantly male (76%), black (93%), middle-aged (median 57years), injected opioids daily or more (58%), and were not on OAT (67%). Fifty-five (55%) patients were initiated on collocated buprenorphine at some point after day 0.

Being on collocated buprenorphine at the time of HCV visit was associated with increased likelihood of visit attendance at weeks 12 ($P = \textbf{0}.002$), 24 ($P = 0.01$), 48 ($P = 0.02$), 72 ($P = 0.003$), and 96 ($P = 0.04$). For patients who attended study visits, being on collocated buprenorphine was associated with a shorter time between planned visit and actual visit at weeks 12 ($P = 0.03$), 24 ($P = 0.04$), and 48 ($P = 0.04$). When looking at patients not on collocated buprenorphine, being on noncollocated opioid agonist therapy vs. not being on OUD treatment did not impact visit adherence.

Conclusion. Evidence-based treatment of HCV and OUD are critical to improving health in PWID. The collocation of HCV treatment with office-based buprenorphine may improve adherence to visits and visit timing, especially in long-term follow-up. Infectious disease providers should offer collocated buprenorphine as a tool to improve long-term outcomes and engagement in this high-risk population.

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2898. Achieving Hepatitis C SVR12 of 95% in Mono-Infected Patients with Severe Comorbidities Using Volunteer Staff and Minimal Clinic Visits and Phlebotomy

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Background. HCV is the most common chronic bloodborne infection in the United States with an estimated 3.5 million infected. With direct-acting antivirals, cure can be achieved in 8 to 12 weeks. To achieve WHO elimination targets by 2030 (>90% reduction in incidence) requires increased detection, access to care, and simpler treatment protocols that patients, challenged by substance use and mental health disorders, can readily complete.

Methods. In 2016, Wake County, NC began HCV testing at 32 sites finding prevalence >10% at 5 shelters and drug treatment centers. An adapted simplified HCV treatment protocol, used in the high prevalence settings of Ukraine and Burma, was implemented at the Open Door Clinic – a free clinic for uninsured persons living in poverty in Wake County. After initially using genotype-specific therapy, we switched to pan-genotypic sofosbuvir/velpatasivr (SOF/VEL) for 12 weeks. Clinic visits were limited to pre-treatment and 12 weeks after treatment completion. Patients were contacted weekly via text to check on their health and adherence.

Results. Thirty HCV mono-infected patients have initiated treatment including 9 women. 21 were infected by IDU, 5 by transfusion, 3 by sex with an infected partner, and 5 have unknown risk. In genotype (GT) testing 22 have GT1, 3 GT 2, and 4 GT3. Major comorbidities include 24 with current or recent IDU, alcohol dependency, psychotic depression or schizophrenia, or missing all medical appointments other than the HCV. Twenty-seven of 30 have completed their prescribed course of HCV therapy and 20 have achieved an SVR at 12 weeks. The 1 patient who failed was admitted to the hospital 4 times in the first 6 weeks of treatment and did not take his medication consistently. An additional 2 remain on treatment and 6 are awaiting results of testing done at 12 weeks post-therapy completion. One patient died within 2 weeks of initiating therapy due to a perforated duodenal ulcer.

Conclusion. Using targeted on-site HCV testing, we identified high prevalence sites. Implementing a simplified HCV treatment program reduces patient and clinic burden and resulted in 95% achieving SVR12 despite severe comorbidities. Expansion of this program to other clinics in Wake County is underway.

Disclosures. **All Authors:** No reported Disclosures.

2899. Decreased Hepatitis C Virus-Associated Mortality in the US 2014–2017 After New Oral Direct-Acting Antiviral Era

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Background. Due to the ease of use and low side effect profile of new direct-acting antivirals (DAA), cure rates for hepatitis C virus (HCV) infection have increased