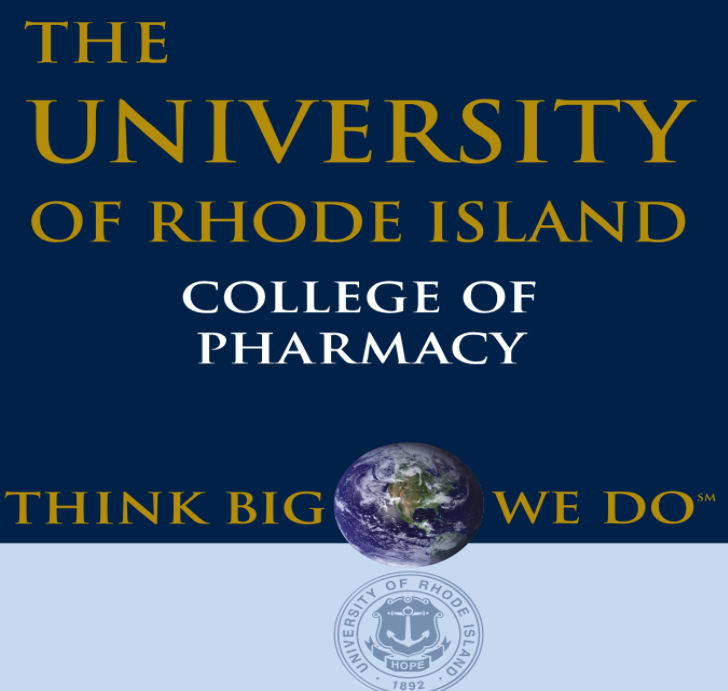




Impact of an Antimicrobial Stewardship Program (ASP) on Antimicrobial Use and Infectious Disease (ID) Consultation

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ABSTRACT

Background: ASPs are used as key strategies to limit the spread of antimicrobial resistance through appropriate antimicrobial utilization practices. However, some institutions may be hesitant to implement an ASP due to a potential loss of ID physician consultations.

Methods: Our ASP team of attending and fellow ID physicians, a clinical ID pharmacist and fellow, and pharmacy residents and students prospectively audited all inpatient antimicrobial use (IV and PO) daily. Pharmacy trainees reviewed patient (pt) charts and identified interventions (INTS) which were then discussed with the team. Verbal communication and/or written notes were used to recommend INTs. The pharmacy fellow followed-up on INTs and documented results. Outcomes, including antibiotic (abx) use, ID consults and abx costs, were compared between the pre-intervention (PIP; Sept 2010-Feb 2011) and intervention period (IP, Sept 2012-Feb 2013). The Wilcoxon signed rank test was used to compare costs, overall abx (IV and PO), IV abx, and PO abx use as days of therapy (DOT) and defined daily doses (DDD)/1000pt days (PD).

Results: During the IP, 539 pt records were reviewed. These pts were 23 - 89 yrs (mean 69.5± 13.1), 96.5% white, and 92.0% male. The majority of pts were treated for PNA (29.1%), UTIs (19.1%), or SSSIs (19.3%). There were 273 INTs made, with an acceptance rate of 76.2% (13.2% unknown if team received INT or were not applicable ie. pt discharged/abx changed). Overall abx use decreased significantly from 30,147 to 25,980 gms (p=0.007) and from 862.5 to 761.5 DDD/1000 PD (p=0.048). The decline in DOT/ 1000 PD, from 708.4 to 644.5, a change of 63.9 DOT/1000 PD, was not statistically significant. IV abx use decreased by 70.9 DOT/1000 PD (p<0.001), while PO abx use had a non significant increase of 3.5 DOT/1000 PD. For IV abx, vancomycin, piperacillin/tazobactam, and moxifloxacin use decreased by 12.5, 7.2, and 10.5 DOT/1000 PD, while ceftriaxone and ampicillin/sulbactam use increased by 9.4 and 7.6 DOT/1000 PD, respectively. Total abx costs decreased \$88,407 from the PIP to IP, from \$37.3 to \$30.7/PD (p=0.005). ID consults/1000 PD increased 22.3%, from 7.6 to 9.8.

Conclusions: Implementing an ASP with prospective audit and feedback was associated with significant reductions in abx use and pharmacy costs, while increasing ID consults compared to the pre-intervention period.

BACKGROUND

- ASPs promote appropriate antimicrobial use and are used as key strategies to limit the spread of antimicrobial resistance¹
- Some institutions may be hesitant to implement an ASP due to a potential loss of ID physician consultations²
 - 45% ID physicians believe that participation in ASPs leads to a loss of consultation requests³
- ASPs should augment the activities of an ID consult service and should encourage physicians to request formal ID consults in complex patients⁴
- Thus, ASPs should generate ID consults

METHODS

- PVAMC – VA teaching hospital, licensed 118 beds
- ASP team (attending and fellow ID physicians, a clinical ID pharmacist and fellow, and pharmacy residents and students) prospectively audited all inpatient antimicrobial use (IV + PO) daily (Monday-Friday)
- Pharmacy fellow, residents, students identified interventions, discussed with ID physician/pharmacist
- Pharmacy fellow followed up on interventions and documented results
- Timeline:
 - Pre-intervention period (PIP) – Sept 2010 – Feb 2011
 - Intervention period (IP) – Sept 2012 – Feb 2013
- Wilcoxon signed rank test used to analyze data

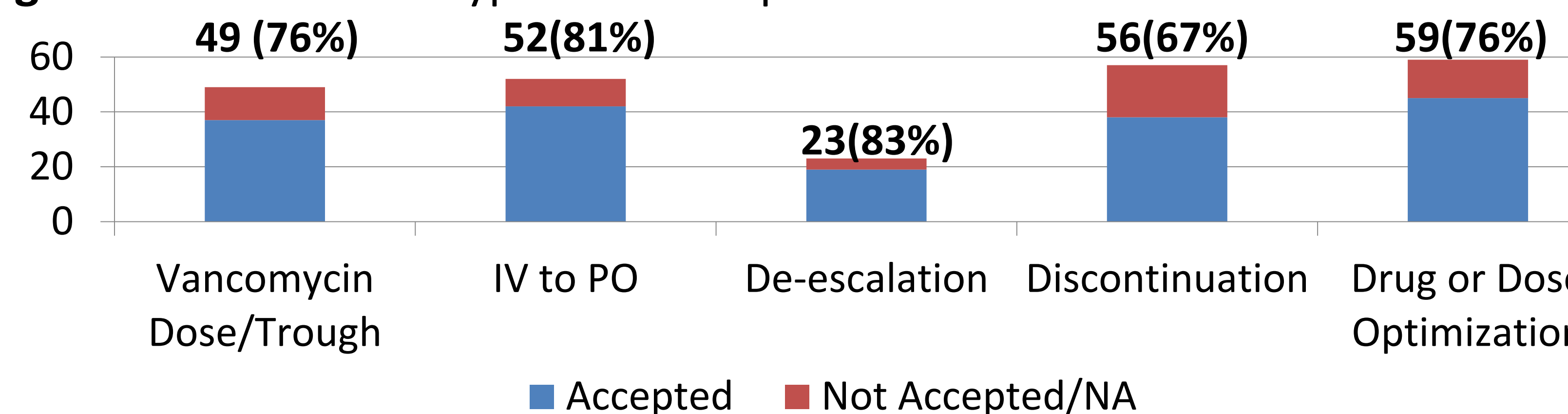
RESULTS

Table 1. Patient Characteristics of Patients Reviewed During the IP

Patient Characteristics	N= 539
Age in years, mean ± SD (range)	69.5 ± 13.1 (23-89)
Male, n (%)	520 (96.5%)
Caucasian, n (%)	496 (92.0%)
Service Admitted, n (%)	
Medicine	410 (76.1%)
Surgery	68 (12.6%)
Intensive Care Unit	50 (9.3%)
Psychiatry	11 (2.0%)
Antimicrobial Indication, n (%)	
Pneumonia	157 (29.1%)
Urinary tract infection (UTI)	105 (19.5%)
Skin and soft structure infection	103 (19.1%)
Length of stay in days, mean ± SD (range)	7 ± 10.6 (1-156)

- Interventions made in 196 patients (36.4 %)
- 273 interventions made with an **overall acceptance rate of 76.2%**
- 13.2% of interventions not accepted, unknown if the team ever received the intervention or were not applicable (ie. pt discharged/abx changed)

Figure 1. Intervention types and acceptance rates



RESULTS

Figure 2a-c: Overall, IV, and PO Antibiotic Use in DOT and DDD/ 1000 PD
2a. Overall Use- ■ Pre- Intervention Period ■ Intervention Period

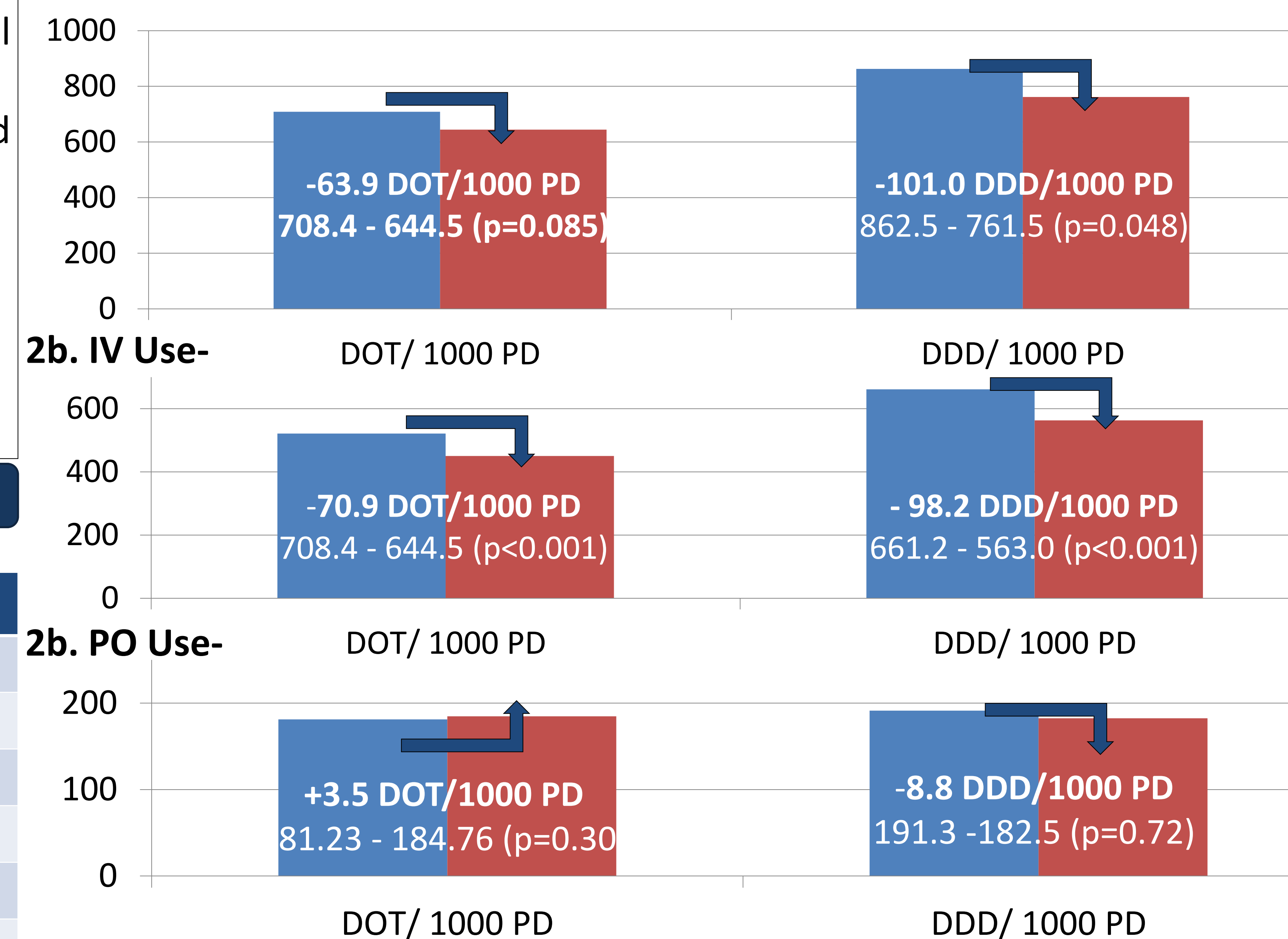


Table 2. ID Consults and Cost Savings

	Total	Per Patient Day
ID Consults	PIP = 79; IP = 96 TOTAL = ↑ 17	PIP* = 7.6; IP* = 9.8 (p=0.09)
Cost Savings	PIP = \$387,847; IP = \$299,440 TOTAL = ↓ \$88,407	PIP** = \$37.3; IP** = \$30.7 (p<0.01)

*= Consults/ 1000 PD, ** = Costs/ PD

CONCLUSIONS AND FUTURE DIRECTIONS

- Implementing an ASP with prospective audit and feedback was associated with significant reductions in antibiotic use and pharmacy costs, while increasing ID consults compared to the pre-intervention period
- Next Steps:
 - Collect patient level data to assess whether patients in each group were balanced with respect to comorbidities/illness severity
 - Measure outcomes to assess impact on patient outcomes, patient safety, and resistance

References 1. Dellit TH, et al. CID 2007;44:159-77. 2. Owens RC, et al. AJHP. 2009 Jun 15;66(12 Suppl 4):S15-22. 3. Sunenshine RH, et al. CID. 2004;38:934-938. 4. Tamma PD, et al. ID Clin North Am. 2011 Mar;25(1):245-60.

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