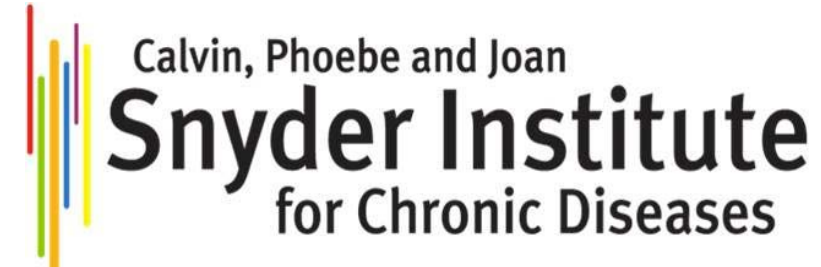


External Validation of Estimates of Antibacterial Dispensing in the IMS Brogan Xponent® Database in a Canadian Province

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Background:

- Alberta is a province of ~ 4 million people in western Canada.
- IMS Brogan (IMS) Xponent® database receives ~60-70% of retail pharmacies dispensing records.
- IMS Brogan estimates total use using a proprietary method for estimation within a geographic area.
- Many studies use IMS data for monitoring drug use in the community.¹⁻⁴
- IMS data may serve to identify potential Antimicrobial Stewardship (AS) targets.
- A provincial database, Pharmacy Information Network (PIN) was created in 2007. Reporting by all pharmacies is ~90% compliance by recent report.
- Comparing methods of measurement is often performed by simple linear regression but it has limitations that have been highlighted in literature for several decades.⁵
- Recently, guidelines have been published in biomedical statistical literature for reporting reliability and agreement studies: adaptable to compare two datasets.⁶
- Objective was to validate the IMS Brogan estimates for the province of Alberta using data from the PIN using various agreement measures.

Methods: Guidelines for reporting reliability and agreement studies (GRRAS) were followed.⁶ We obtained dispensing data from IMS and PIN for systemic AB [ATC J01] for 8 consecutive quarters from 07-2010 to 06-2012. Number of scripts were provided for all systemic antibacterials (AB) in 5 provincial health zones grouped by age (0-17 years, 18-64 years and ≥65 years old). Population estimates for each zone and each age group as of June 30 (mid-year) of 2010, 2011 and 2012 were derived from the Alberta Health Care Insurance Plan and were used to calculate the annual rate of prescriptions per 1000 inhabitant-day (PrID) using data from IMS and PIN. Agreement between measures was assessed using the Bland-Altman method and the St Laurent gold standard correlation coefficient. Simple linear regression was performed for comparison purposes.

Results: Annual rates of total antibacterial use from PIN were 1.49-1.64 PrID compared to IMS estimated rates of 1.59-1.79 PrID, a discrepancy of 6.4-11.3% higher for IMS data. Regular linear regression of PrID of total antibiotic consumption for all ages for all zones was moderate (r-squared = 0.63, Fig. 2) Analysis by class of AB at the zone/age group/year level by Bland-Altman plots found a mean difference (PIN-IMS) of -0.010 PrID and 95% limits of agreement of -0.112 to 0.091 from data on class of antibiotic used in each zone for each age group in the 3 years of data (Fig 3). Outliers were commonly observed for drug classes used in relatively high rates; greater than 0.6 PrID (average of the two methods). These outliers more commonly showed IMS reported greater values than PIN. St Laurent correlation was 0.68 (95% CI 0.49-0.86) for total (all AB) PrID at the zone level for each year.

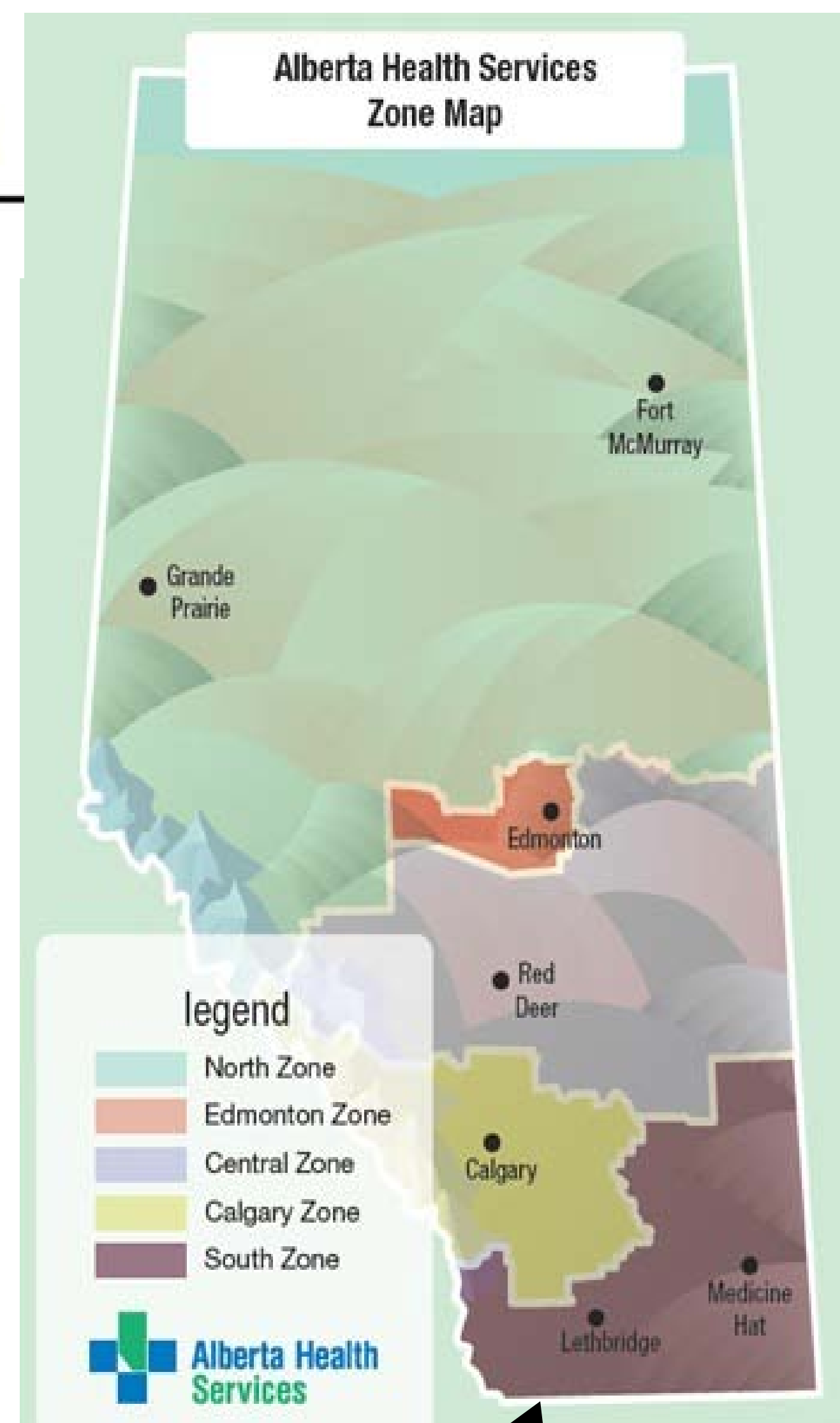
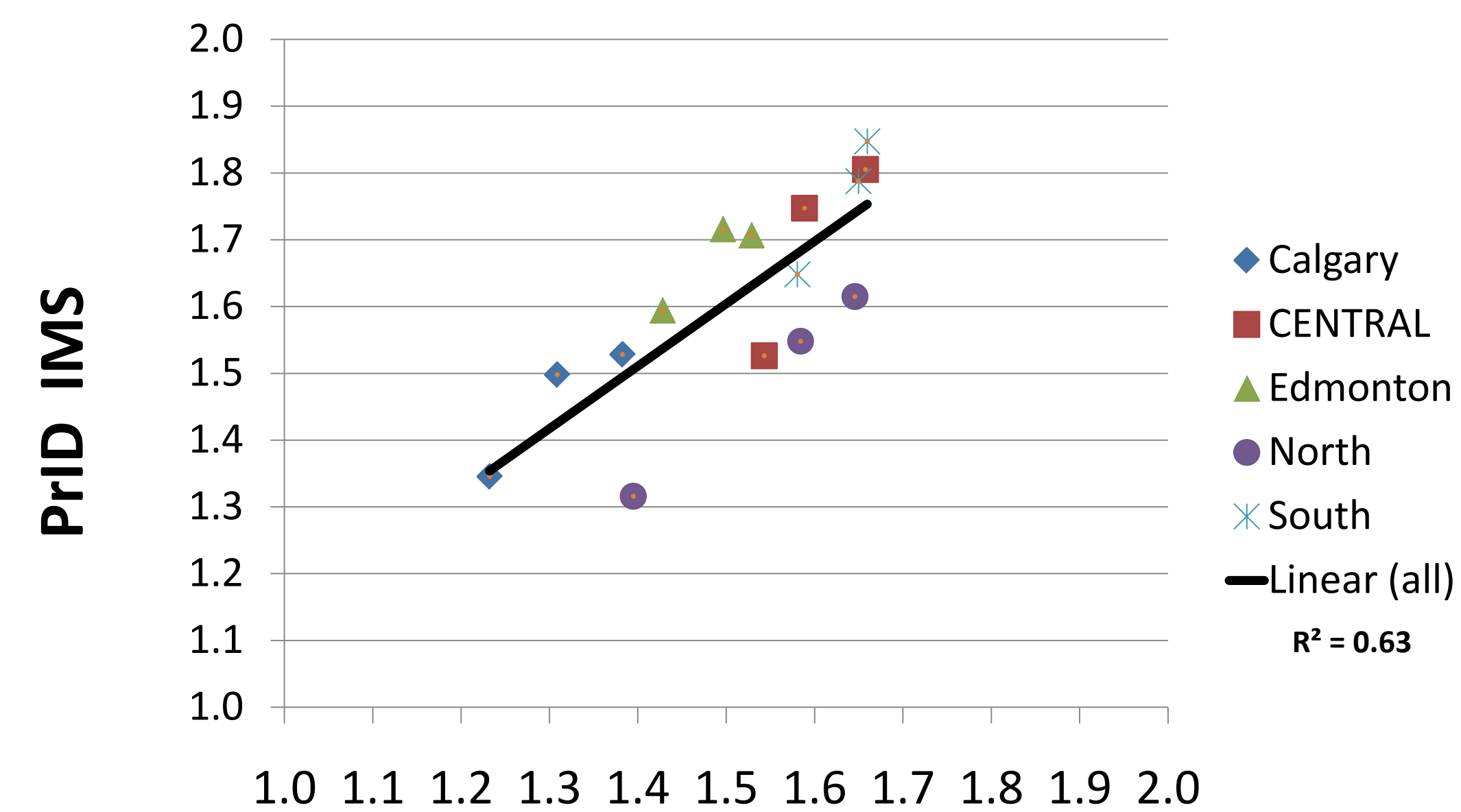


Fig 1. AB Health Zone Map

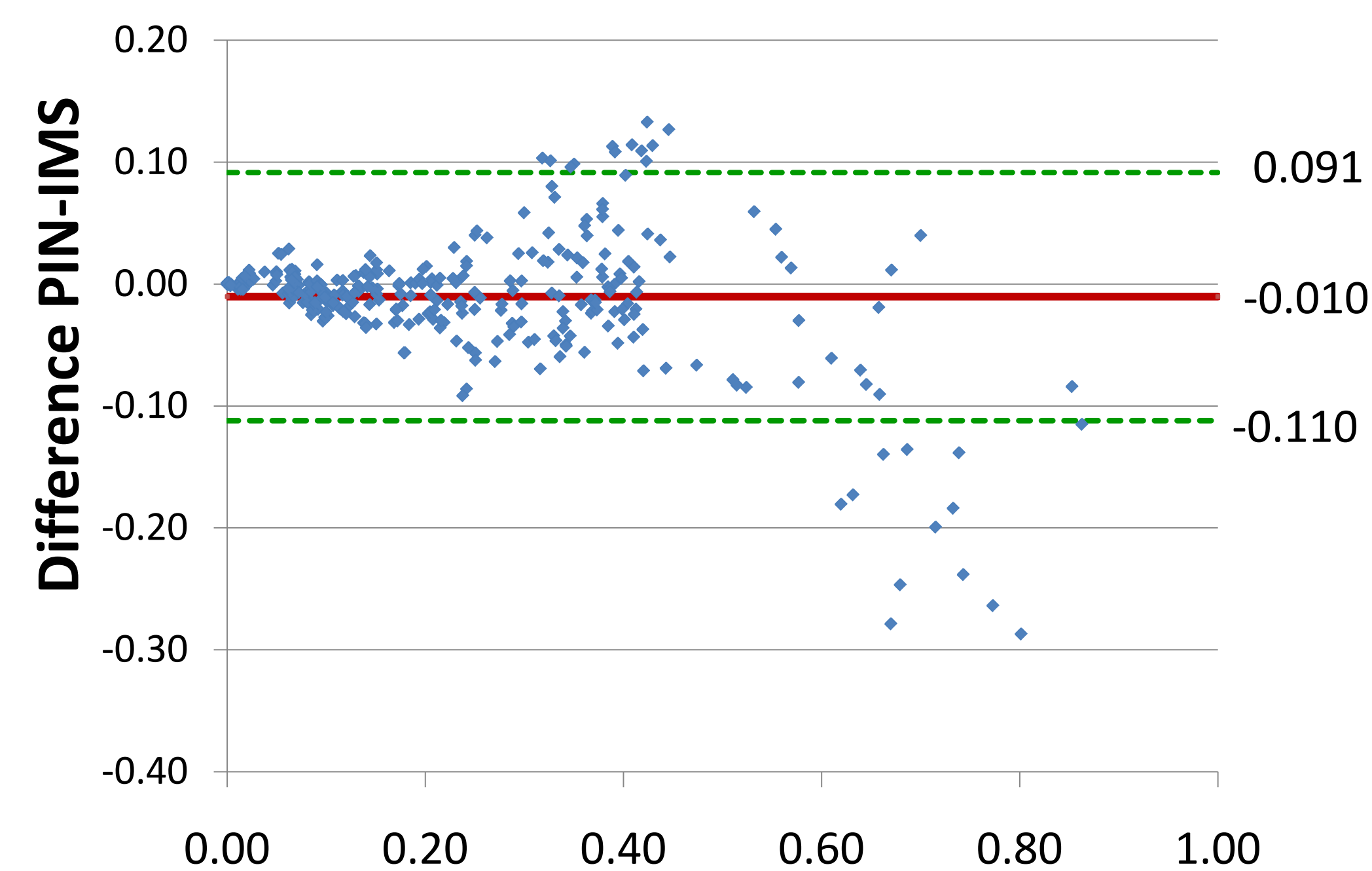


Fig 2. Regression plot of prescriptions per 1000 inhabitant-days (PrID) IMS vs Alberta PIN



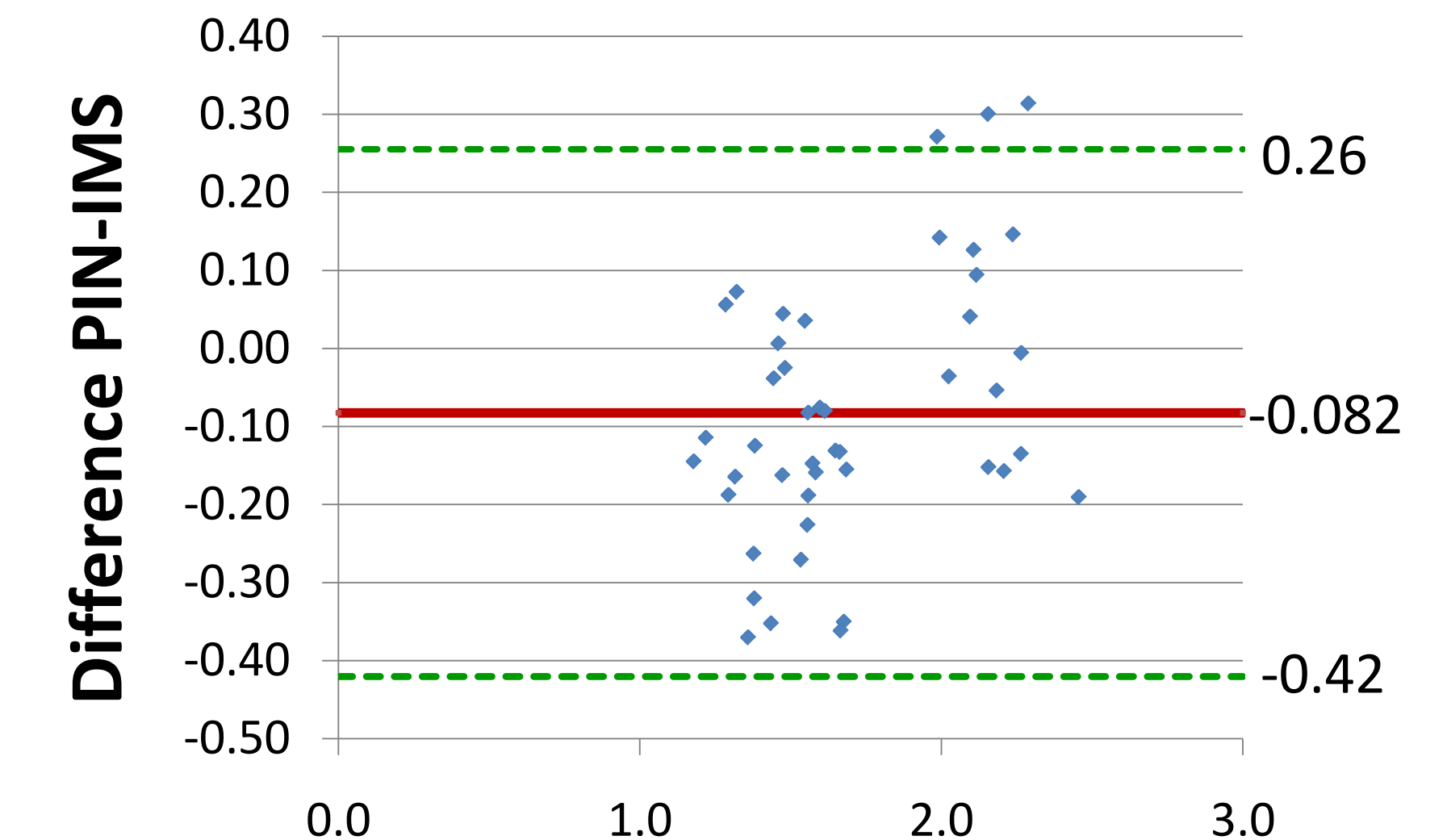
Prescriptions per 1000 inhabitant-days (PrID) : PIN database

Fig 3. Bland Altman Plot – PrID of each antibiotic class for year, zone and age group (n=360)



PrID: PIN & IMS databases (average)

Fig 4. Bland Altman Plot – PrID of total antibiotics for year, zone and age group (n=45)



PrID: PIN & IMS databases (average)

Conclusions: We found moderate-good agreement between PrID for AB derived from the IMS vs PIN databases using regular linear correlation or St. Laurent gold standard correlation, dependent on the level of analysis (eg. total AB vs AB use by class). Bland-Altman analysis overcomes some of the limitations of linear regression and is easy to perform. Our results of Bland-Altman analysis found that the mean difference and 95% limits of agreement could be clinically relevant with respect to total or class of systemic antibacterial consumption. We are aware of one other study independently validating the IMS Compuscript® database, which made similar conclusions to us.⁷ Our findings would be strengthened by replication using similar databases from other jurisdictions.

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