

The contribution of injecting drug use to hepatitis C virus transmission globally, regionally, and at country level: a modelling study

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Background

- Injecting drug use (IDU) is an important risk factor for Hepatitis C virus (HCV) transmission
- HCV prevalence amongst people who inject drugs (PWID) is generally high but the prevalence of PWID in most countries is <1% of adults
- Modelling was undertaken to estimate the degree to which IDU contributes towards HCV transmission at country, regional and global levels

Methods

- A dynamic HCV transmission model simulated the country-level HCV epidemic amongst PWID and the general population
- The model for each country was calibrated using country-specific data from UN datasets and recent systematic reviews on HCV prevalence amongst PWID and the general population, and the proportion of adults that are PWID
- We estimated the dynamic **population attributable fraction (PAF) of HCV due to IDU**:
 - Defined as the proportion of new HCV infections within each country that would be prevented if the additional HCV transmission due to IDU were removed for the 12-year period 2018-2030
- Associations between the 12-year population attributable fraction of HCV due to IDU (logit transformed) and demographic variables were investigated using regression models

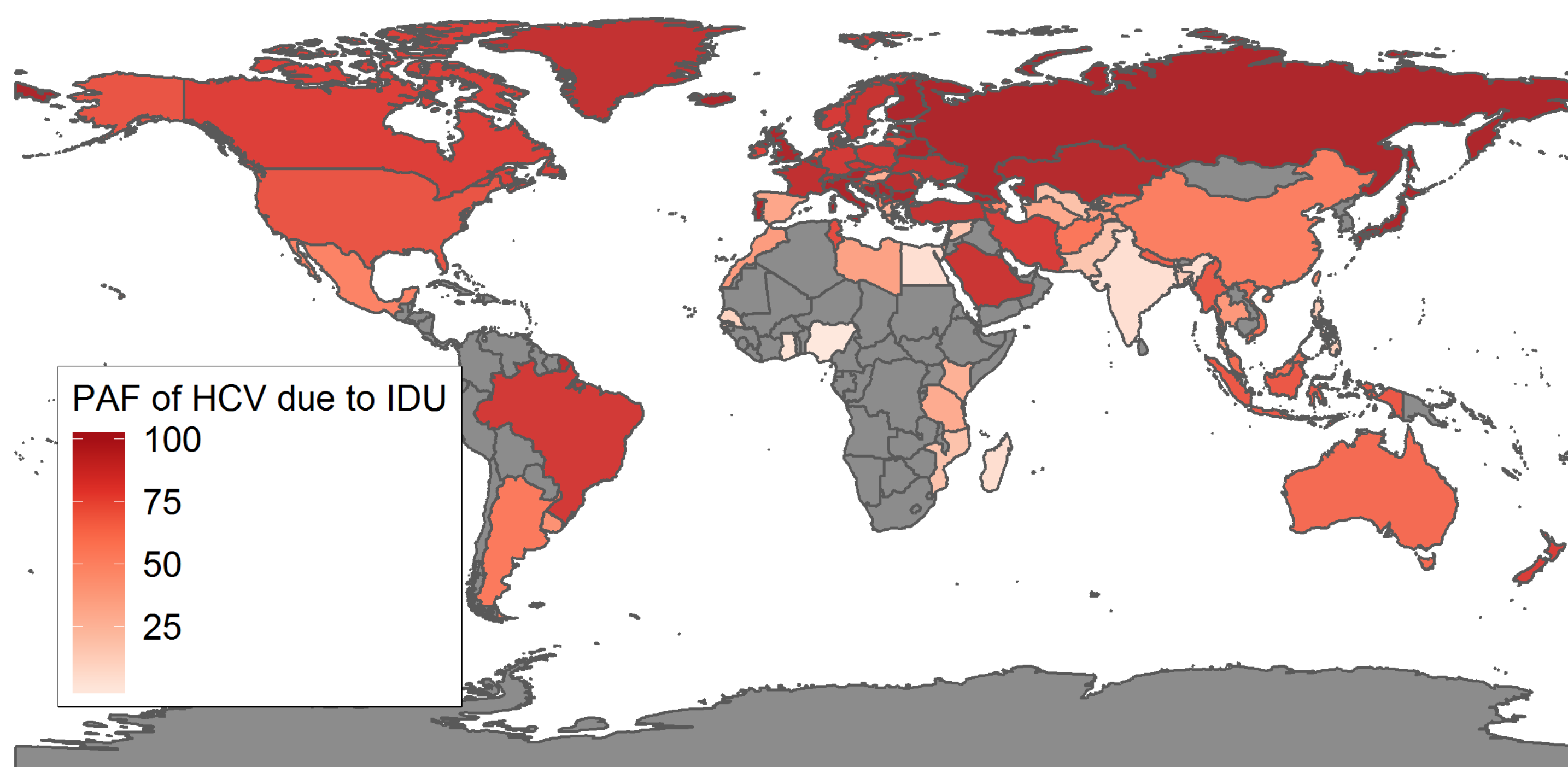
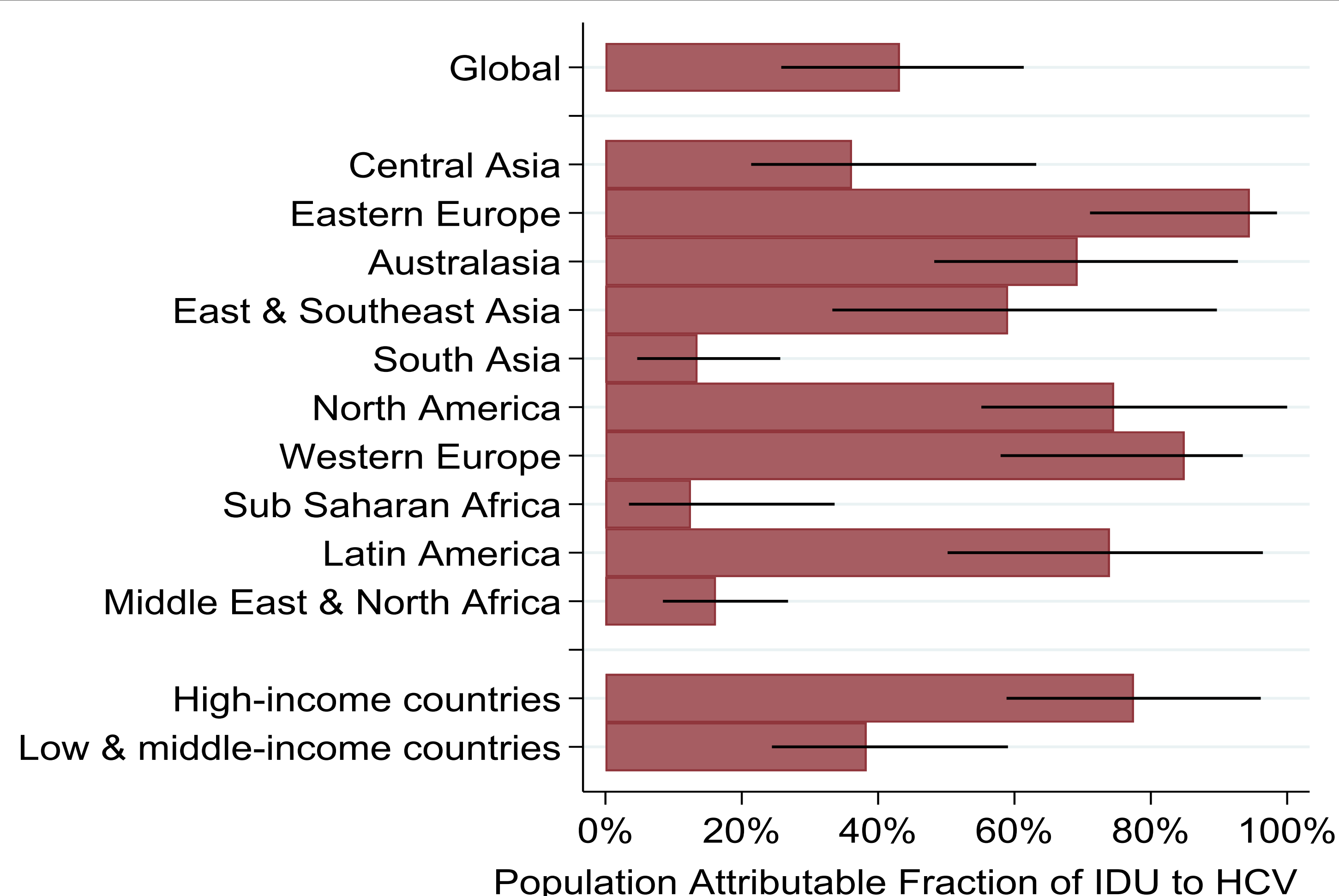


Figure 1: Map of the countries included in the model, colour scaled by the population attributable fraction (PAF) of HCV infections due to IDU from 2018 to 2030

Figure 2: Regional and global estimate for the population attributable fraction of IDU to HCV transmission from 2018-2030, with 90% credibility intervals



Results

- The model included 88 countries comprising 85% of the global population, see figure 1
- The model predicts 0.2% of individuals were PWID in 2017 and 8% of prevalent HCV infections in 2017 were among PWID
- Globally, if the additional transmission risks due to IDU were removed, then an estimated **43% (90% credibility interval: 26%-61%)** of all incident HCV infections (the population attributable fraction) would be prevented during 2018-2030, varying by region, see figure 2
- IDU contributes most to HCV transmission in high-income settings, where 78% of new HCV infections could be prevented from removing the extra risk due to IDU, whereas in lower and middle-income countries it is 38%
- Table 1 shows associations between the population attributable fraction and demographic variables; the coefficients show the relationships:
 - Injecting duration (in years) and the percentage of prevalent infections that are among PWID are both strongly associated with the population attributable fraction of HCV due to IDU

Table 1: Multivariable coefficients of the associations between the population attributable fraction of IDU due to HCV (logit transformed) and demographic variables

Demographic variables (2017 values)	Multivariable coefficient (95% confidence interval)
GNI per capita (per \$1000)	0.01 (-0.02, 0.05) [p=0.576]
Population percentage of PWID	0.50 (-1.37, 2.38) [p=0.594]
HCV prevalence among PWID	0.04 (-0.01, 0.09) [p=0.159]
HCV prevalence among general population	-0.21 (-1.13, 0.71) [p=0.649]
Injecting duration (years)	-0.35 (-0.53, -0.17) [p<0.001]
% of prevalent infections among PWID	0.32 (0.22, 0.42) [p<0.001]

Limitations

- Data on the prevalence of IDU, and the prevalence of HCV amongst PWID and the general population was variable in quality
- Taking data from different sources means that under and over-estimation of the PAF of HCV due to IDU may occur in certain countries

Conclusion

- IDU contributes **substantially** to the global burden of HCV, but this varies widely across countries
- Scaling up HCV prevention interventions for PWID, including needle and syringe programmes, opioid substitution therapy, and HCV treatment will be essential to meet WHO elimination targets in many settings

Disclosure of Interest Statement:

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