QUESTIONABLE ANTIBIOTIC PRACTICES

OBTAINING RELIABLE ESTIMATES OF CONSUMERS' BEHAVIOURS

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I have no conflicts of interest.

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REDUCING HEALTHCARE ASSOCIATED INFECTIONS

Antimicrobial resistance (AMR)

- AMR growing worldwide health concern
  - WHO: “key global health issues facing our generation” - issued a Global Action Plan.
  - National AMR strategy–2015-2019
- AMR is a complex and costly problem
  - By 2050 WHO 10 million deaths USD $10 trillion loss GDP
  - Aus: AMR adds $250 million pa healthcare and $500million pa antimicrobials
- Diverse range of stakeholders
  - consumers one important group

Problematic Consumer Behaviours

Two key types of behaviours

1. Self-medication
2. Non-adherence

Systematic review and meta-analysis (Kardas et al, 2005).

- 40% not taken as prescribed
- 29% use of leftovers
- intentional and unintentional (Hawkings, Butler, & Wood, 2008).

- Lack reliable estimates for what consumers are doing with their antibiotics, particularly in Australia

Aim

- Gain reliable prevalence estimates for a range of consumers' behaviours concerning antibiotic usage.

- But how?
- And what do we mean by reliable?

Ubiquity and importance of self report

Subjective judgment from expert and lay sources is woven into all human knowledge. Surveys of behaviors, attitudes, and intentions are a research staple in political science, psychology, sociology, and economics. Subjective expert judgment drives environmental risk analysis, business forecasts, historical inferences, and artistic and legal interpretations. *(Prelec, 2004)*

Self Report Data

- Range of biases
  - Confirmation/anchoring/acquiescence/focusing/framing/ social desirability
- Social desirability
  - Under-reporting of problematic behaviours
  - Over-reporting of good/responsible behaviours

Bayesian

Drazen Prelec, MIT

Some top secret potion used by the authorities to get the truth from terrorists

*"BTS is a scoring system for eliciting and evaluating subjective opinions from a group of respondents, in situations where the user of the method has no independent means of evaluating respondents' honesty or their ability**. It leverages respondents' predictions about how other respondents will answer the same questions**. Through these predictions, respondents reveal their meta-knowledge, which is knowledge of what other people know. " (Prelec, Science, 2004)*

Bayesian truth serum (BTS) is a scoring instrument

- Designed for situations where objective truth is beyond reach
- Rewards truthful reporting of private opinions or judgments
- Exploits the fact that a personal opinion is a signal about the opinions of others (the relationship between knowledge and meta-knowledge)
- Analyzed under ideal conditions (rational experts, game theory)
- It works at the level of one question
- Respondents to supply not only their own answers, but also percentage estimates of others' answers.
- The formula then assigns high scores to answers that are surprisingly common

BTS Formula

Information Score

Prediction Score

$$Score\ for\ respondent\ r = \sum_{k}^{m} x_k^r \log \frac{\bar{x}_k}{\bar{y}_k} + \sum_{k}^{m} \bar{x}_k \log \frac{y_k^r}{\bar{x}_k}$$

The Information score measures whether an answer is surprisingly common

The prediction score measures prediction accuracy (and equals zero for a perfect prediction)

BTS Applied Research

- John, Lowenstein & Prelec (2012)
  - Research practices using incentives for truth-telling
  - RCT design (no incentive vs BTS incentive)
  - 2000+ psychologists
  - Questions of a range of problematic research practices

Questionable Research Practices

Behaviour	Prevalence
Failing to report all of a study's dependent measures	66%
Selectively reporting studies that worked	50%
Reporting an unexpected finding as having been predicted from the start	35%
Falsifying data	1.7%

These estimates are based on an incentivised condition whereby participants are rewarded for giving more truthful answers.

Prevailing research norms

3 Key Estimates

1. Self-admission rate (have you engaged in the behaviour?)
2. Prevalence estimate (how often others engage in the behaviour?)
3. Admission estimate: (how often others would admit to engaging in behaviour?)

	Behaviour	Abbreviated Name
1	Explicitly asked a doctor for antibiotics because you thought you needed them to get better.	Asked
2	Explicitly asked a doctor for antibiotics "just in case" you became unwell, because you would be travelling interstate or overseas.	Travel
3	Explicitly asked a doctor for antibiotics when you were pretty sure you did not really need them.	Not need
4	Exaggerated your symptoms to a doctor, so that you would be given an antibiotic prescription.	Exaggerate
5	Invented an excuse to get an antibiotic prescription for a "just in case" situation.	Excuse
6	Saw another doctor to get antibiotics when the first doctor did not prescribe antibiotics.	Another Dr
7	Filled a previous prescription for antibiotics so you can treat the illness yourself without going to the doctor.	Previous Script
8	Given your antibiotic prescription to someone else for them to fill and use.	Given Script Other
9	Filled someone else's antibiotic prescription to use yourself	Filled Other
10	Accepted leftover or unused antibiotics from someone else.	Accept from Other
11	Have taken someone else's leftover or unused antibiotics you found in the cupboard.	Cupboard
12	Given your leftover antibiotics to someone else.	Antibiotics Other
13	Have stopped taking antibiotics before the full course was completed.	Stopped Early
14	Have taken antibiotics that were past the expiry date.	Expiry
15	Kept leftover or unused antibiotics for use at another time.	Hoard
16	Discarded leftover or unused antibiotics in the bin or down the sink.	Discard

Example Question

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How do you think about and use antibiotics?

Consumer Behaviours

Behaviour 5: Invented an excuse to get an antibiotic prescription for a "just in case" situation.

What is the percentage of people in the general population who have engaged in this behaviour at least once? Please estimate (%):

Among those who have engaged in this behaviour at least once, what is the percentage who would admit to having done so? Please estimate (%):

Have YOU ever engaged in this behaviour?

- Yes
- No

To what extent do YOU think this behaviour is socially acceptable?

- Not socially acceptable
- Somewhat socially acceptable
- Socially acceptable

To what extent do YOU think this behaviour is socially responsible?

- Not socially responsible
- Somewhat socially responsible
- Socially responsible

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Outcome Measures

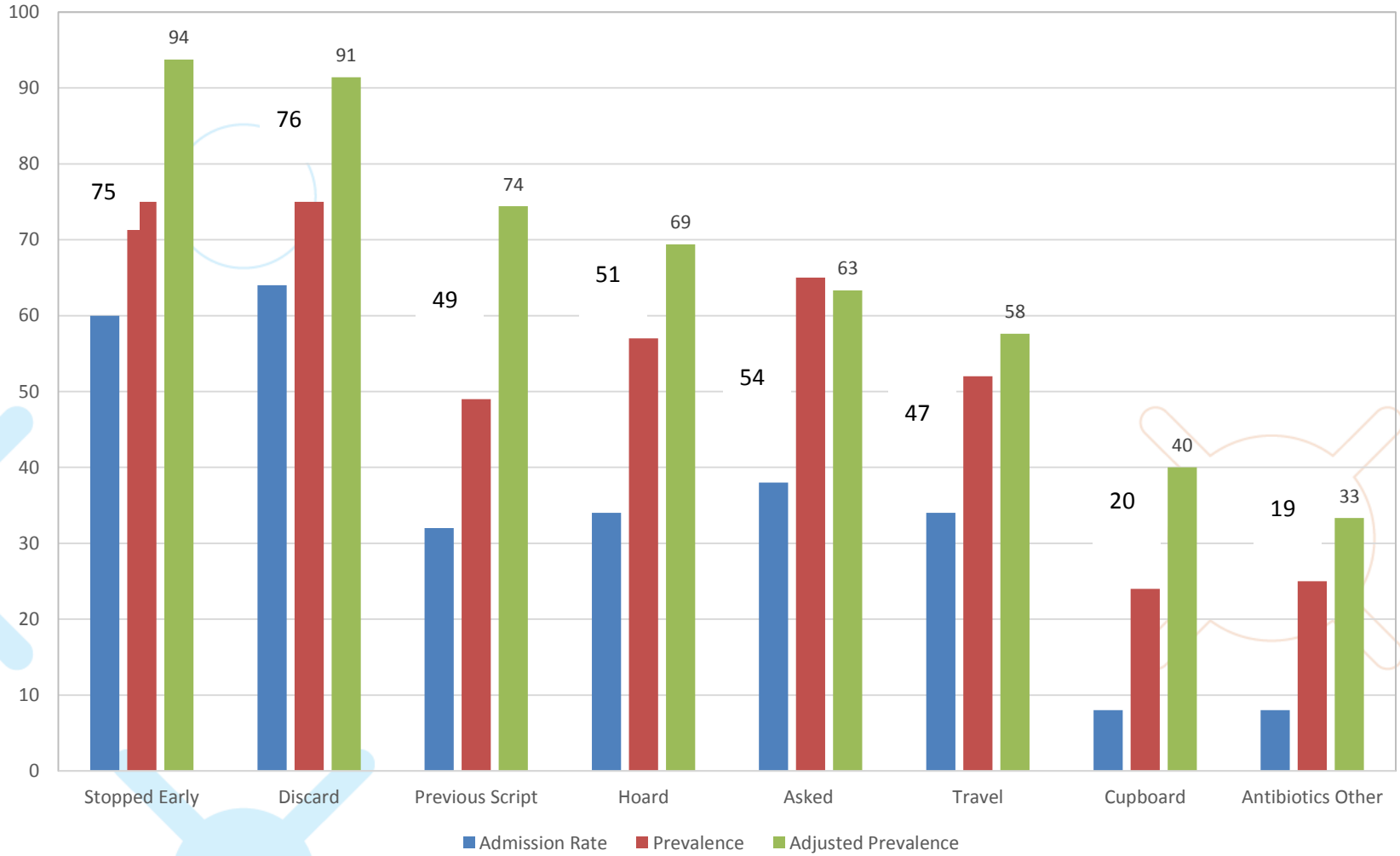
1. Prevalence estimates for 16 behaviours
2. Levels of social acceptability and responsibility
3. Knowledge of antibiotics and resistance
4. Levels of responsibility

Incentives

- Respondents were able to choose a charity (1 of 3) to donate money to.
- The amount of money was linked to their scores on the survey
- More accurate scores resulted in higher donations.
- Small budget but final donations
  - roughly $83 Indigenous Literacy Foundation, $37 Fred Hollows and $90 Royal Flying Drs

Data

- N = 92 (complete), 12 (partial info)
- Sample characteristics (mostly female, highly educated and knowledgeable)
- 85% female
- 35% with postgrad degree
- 95% knowledge correct



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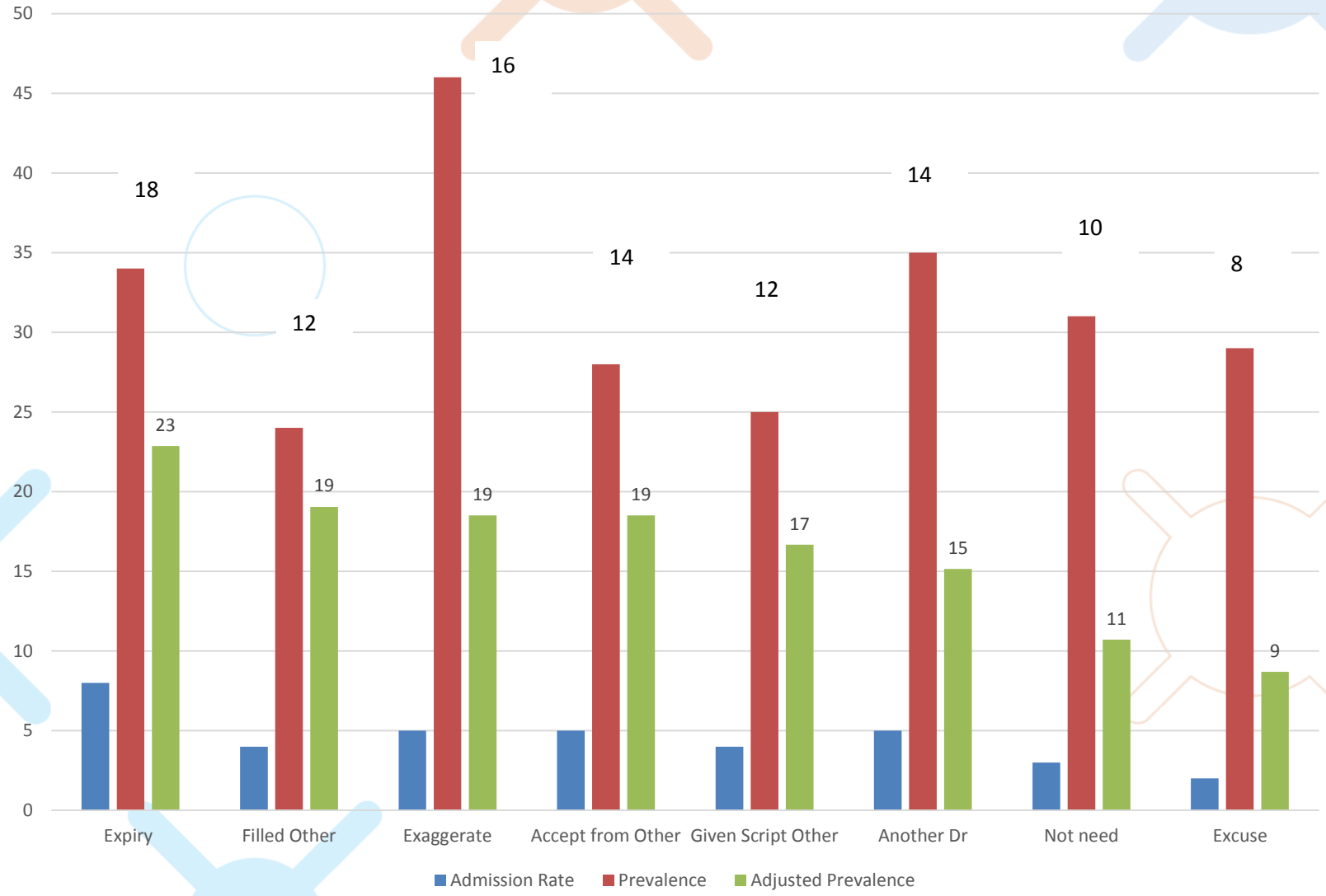

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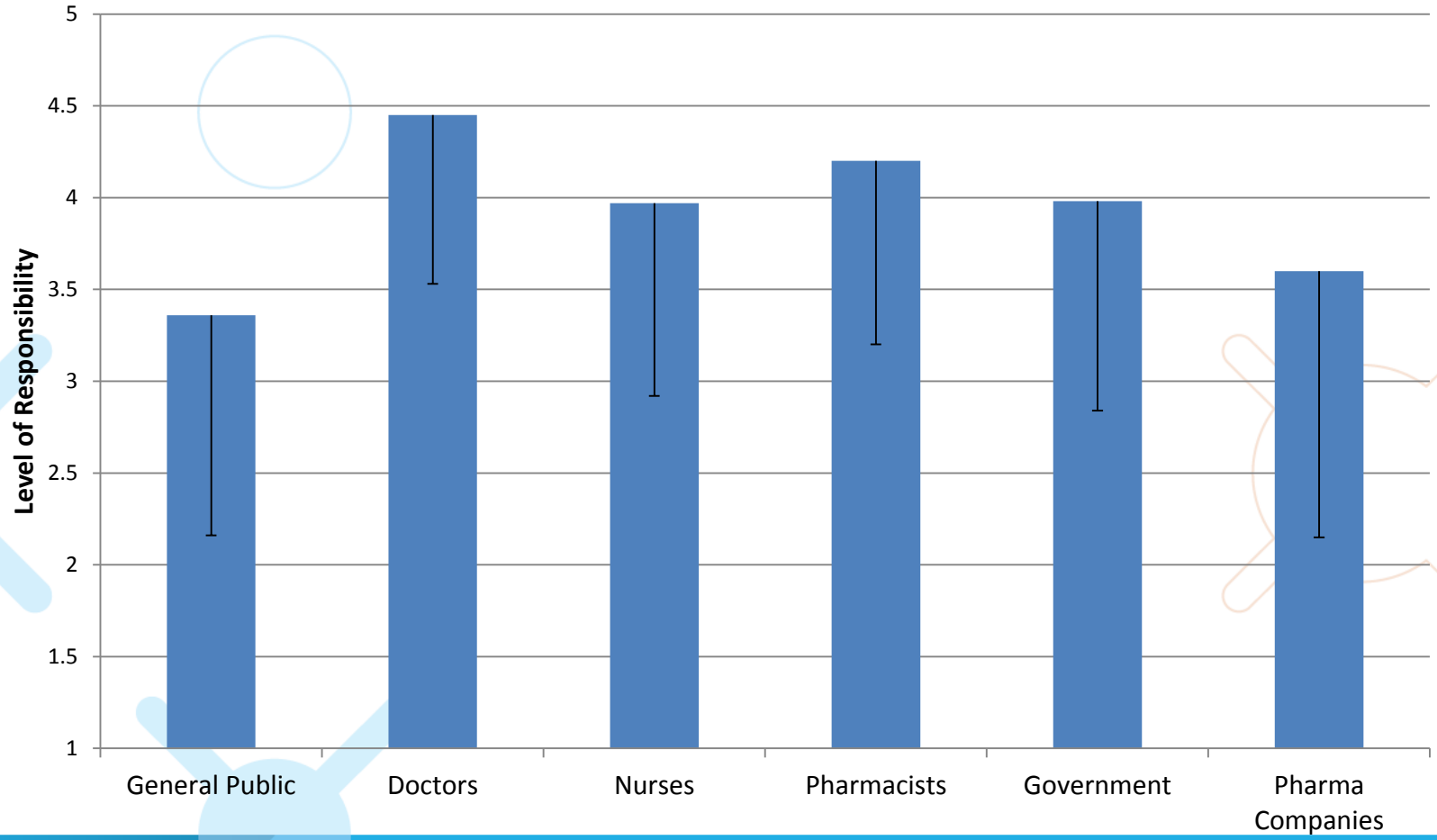
Who is responsible?



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Results I

- 3 most common
  - (1) discarding antibiotics: (2) stopping early (3) fill previous script
- 3 least common
  - (1) invest excuse: (2) ask when not needed: (3) see another Dr

Results II

- Self admission rate: average: 20% (2-64%)
- Adjusted prevalence rate: 40% (9-94%)
- Ratings of social acceptability and responsibility
  - admission rate: SA: r = .88; SR: r = .81
  - prevalence est: SA: r= .79; SR: r = .74
- Is the admission rate linked to time preferences?
  - NO

Strengths & Weaknesses

- Small, non-representative sample
  - But good meta-knowledge
- Assumes consumers have some knowledge of others behaviour
  - Not unrealistic
  - Formula still works when respondents' answers are not typical
- First use of BTS method in this sphere
- Best prevalence estimates given self-report and unverifiable nature of behaviours

Conclusions

- BTS promising method for improving self-report data
- Consumers have an important role to play in reducing AMR
- Target educational campaigns at ……
  - what to do with left-over antibiotics
  - what to do about stopping them early

Future Research

- Aim for a better cross section of the community (↑ representativeness)
- Doctors and pharmacists – specific surveys to get at the frequency of problematic prescribing practices for each profession

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