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Finding both the needle and the
haystack!

Tuberculosis case finding in Wales.

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24/03/2011

Why TB?

- TB is different from other infectious diseases.
 - Slow growing bacteria
 - Few develop primary disease
 - Most develop post primary disease
 - Classic Phytis
 - Incubation period can be over 50 years
 - Can imitate any other disease

What's happening in Wales

- 150 years ago
 - Incidence 1000/100,000
- 2007
 - Incidence <5/100,000
- But local outbreaks occur
 - NOT imported disease

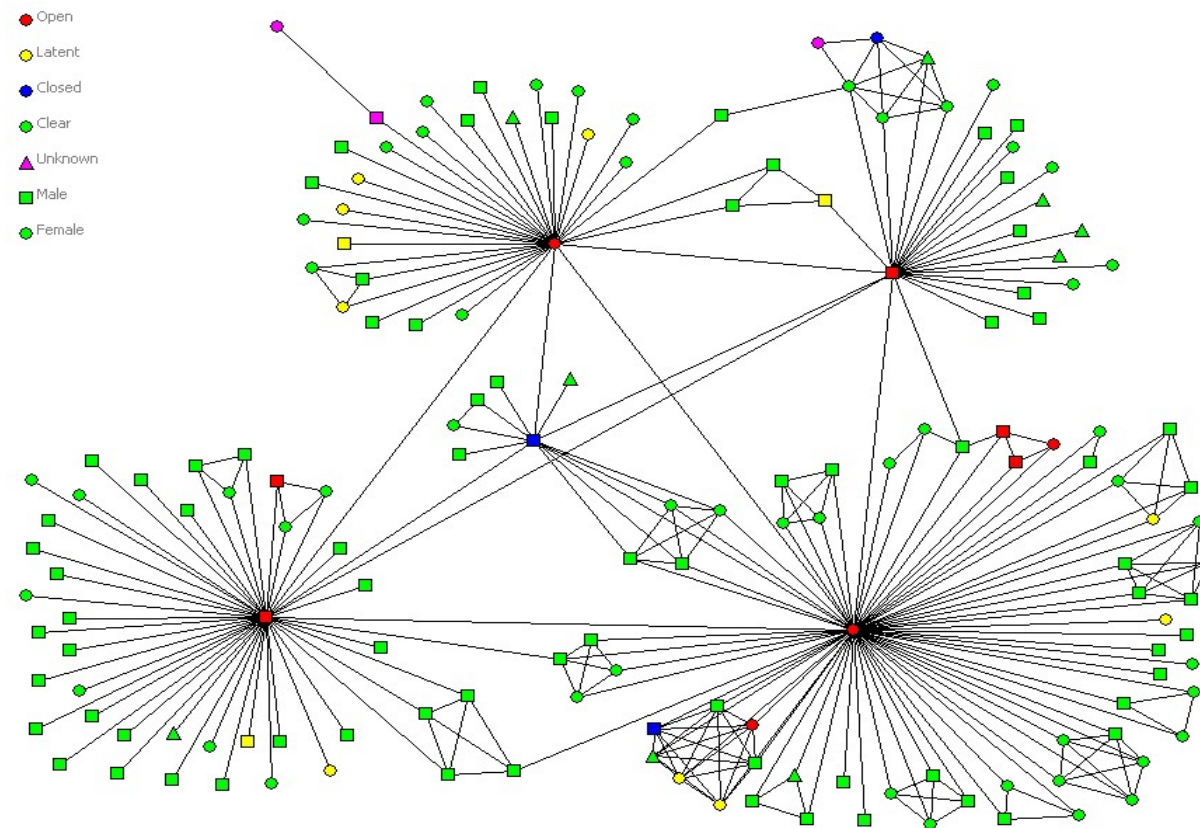
My involvement

- 1997 outbreak in one valley town
 - Young adults & adolescents
- 2000 child dies of TB meningitis
- Further cases come to light
- 2008 more cases diagnosed
- 2010 we start population screening

Meanwhile

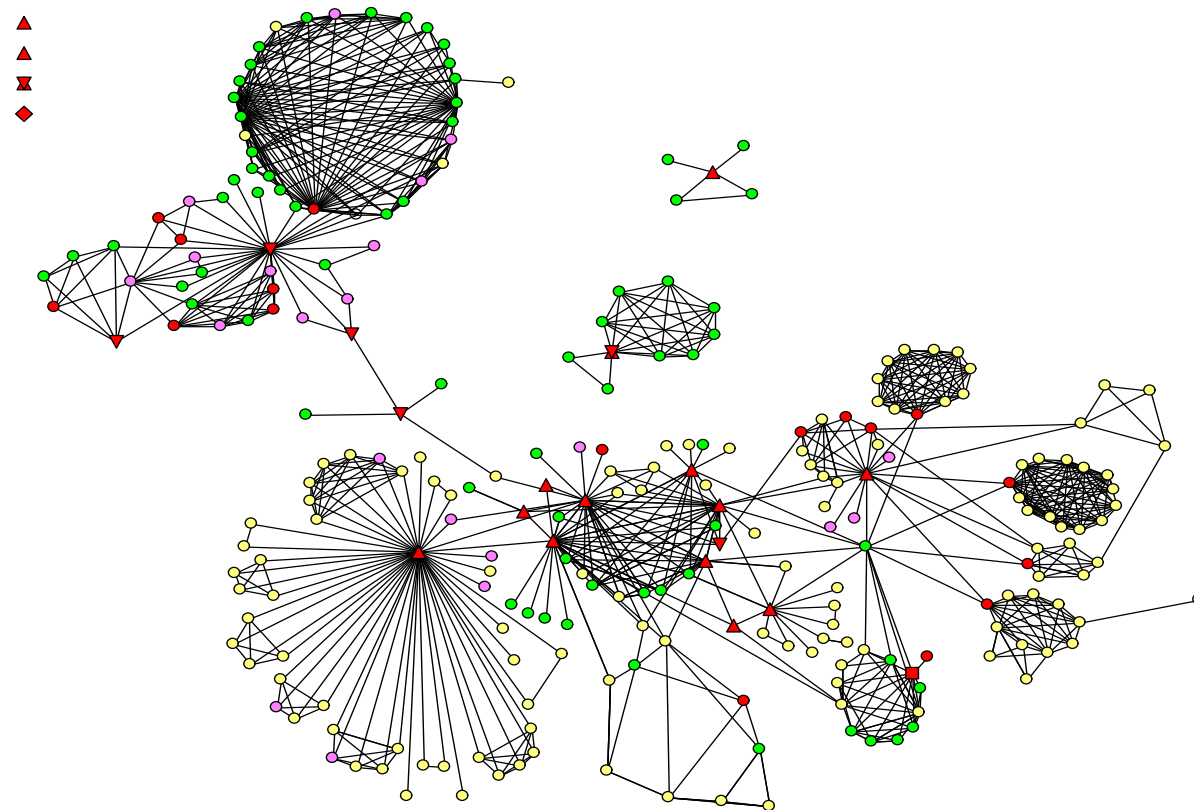
- Outskirts of city
- Pub Outbreak
 - Involving young adults
- Primary school Outbreak
 - Same strain of TB
- 2009 city centre case links to Pub
 - But different strain

Network 1



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Network 2



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In the past year

- A pub based outbreak with three children infected
- A family outbreak with school involvement



The Model (a)

- Agent based approach
 - Individual spread important
 - Large chance element
- Homogenous agents to represent young adults
 - One case at random to act as seed
 - Case finding process is instant
 - When first case diagnosed

The Model (b)

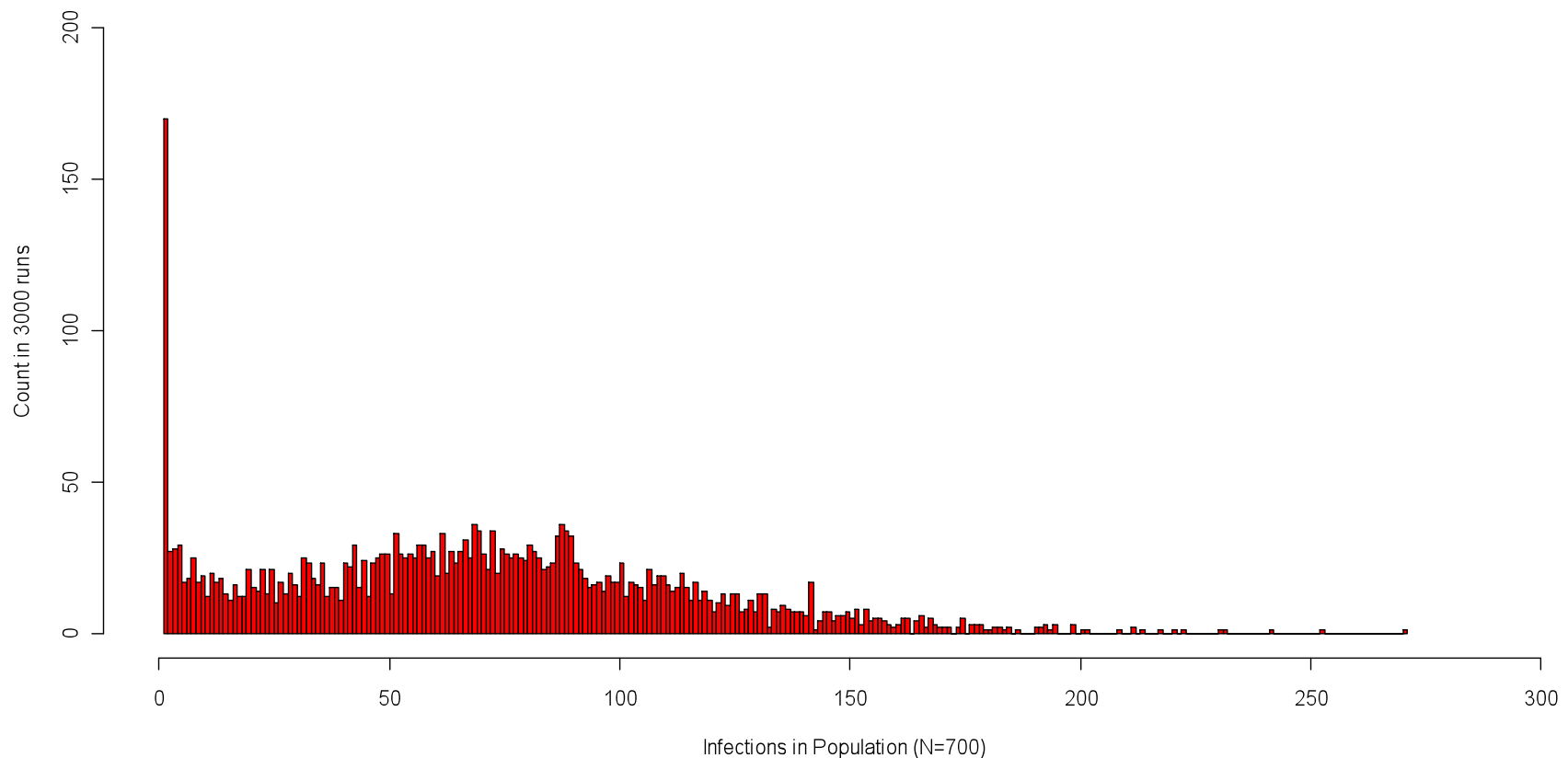
- Agents mix using “Communities model” (Gilbert 2009)
- All “contacts” Clinically relevant
- No births or deaths
- Agents asked about contacts once

Variables

- Contact tracing type
 - Standard or enhanced
- Case finding compliance
- Time dependent contact memory
- Memory of contacts' contacts
 - dependent on meeting frequency

Model's outbreak sizes

Distribution of Outbreaks



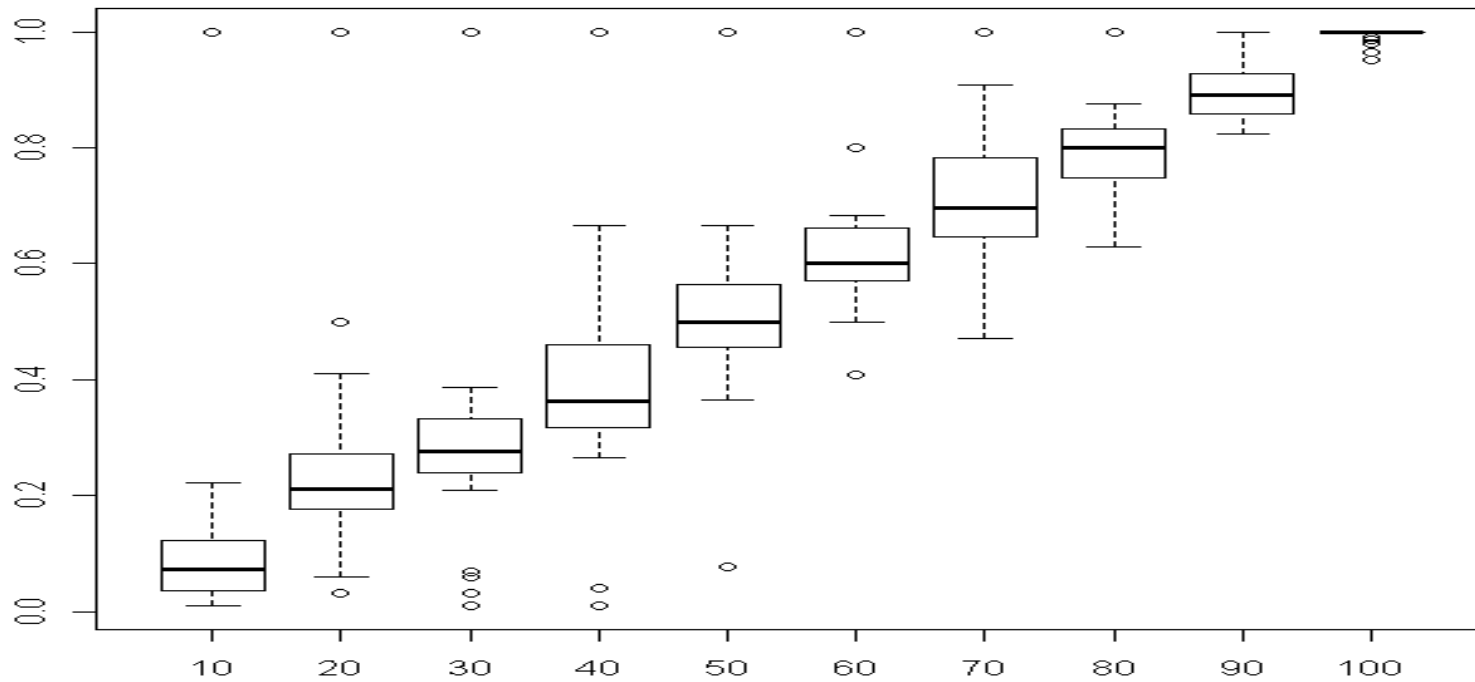
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Compliance is crucial to case finding



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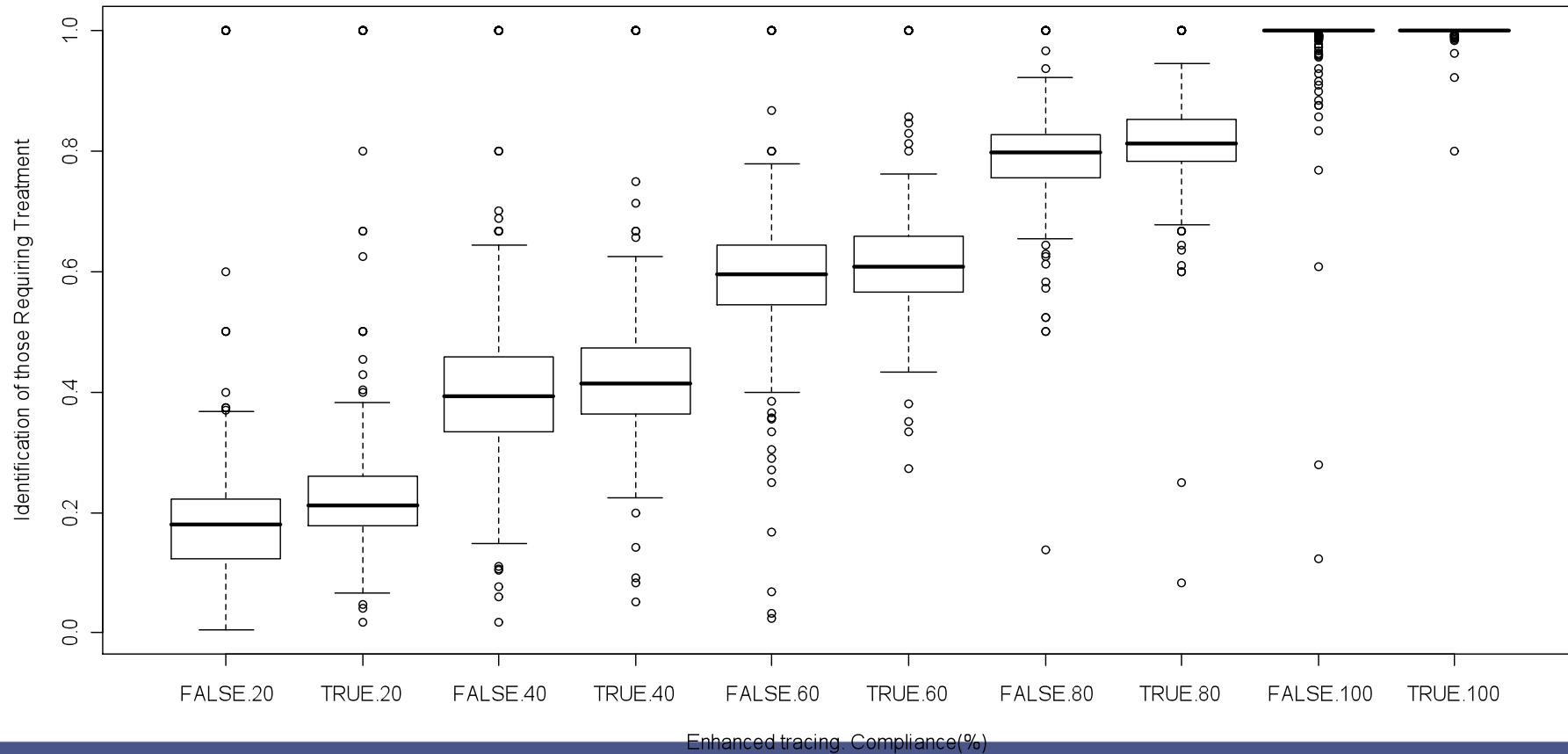


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Enhanced method improves case finding

Effect of Enhanced case finding and Compliance on Identification of Patients

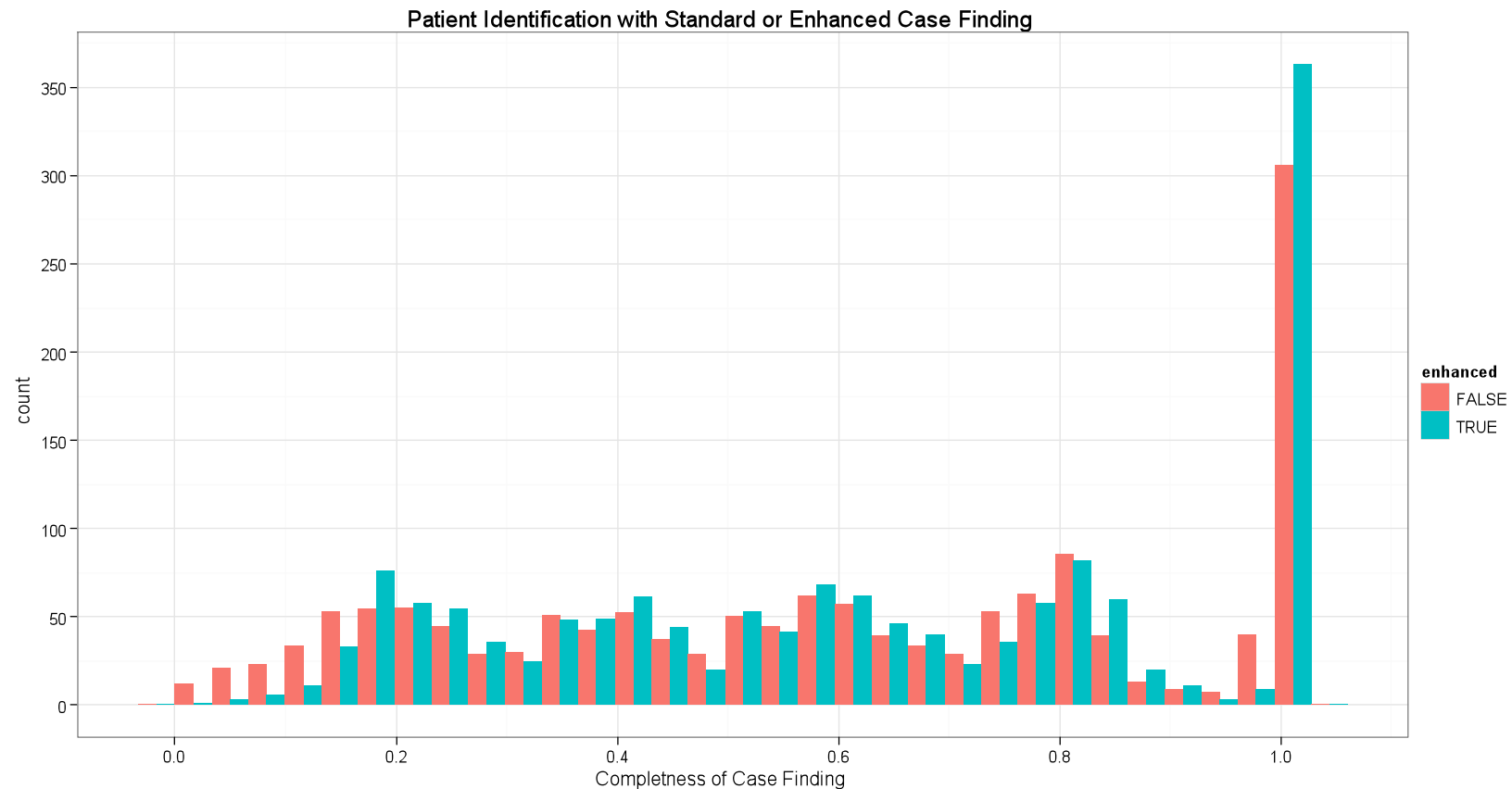


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Particularly at the extremes



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What about some Stats

Case finding Completeness	Standard	Enhanced
Mean	0.60	0.63
Median	0.61	0.63

- Wilcoxon rank test
p=0.0067 for two sided test
3000 runs (1500 of each)

Weakness

- Model assumes people know about contacts' contacts directly
 - No evidence in medical literature
- Compliance universal using behaviour space tool
 - Will try individual random compliance
- Population “tightness” needs exploring

Strengths

- Outbreak sizes reflect reality
- Compliance effect reflects reality
- Outcomes truly unpredictable
 - Felt real
- Suggest modest improvement
 - by minor change in practice.

In practice

- Are asking for contact's contacts
 - Unwillingness to tell us directly
- Model appears to overestimate recall
 - We are still finding cases by indirect routes

Conclusion

- Asking about contacts' contacts is being used in practice
 - Legal position remains unclear
- Work continues but slowly
 - Ensuring staff available to improve TB Control in Wales is current priority
- Still need to write the papers!