

# Oxford Hospital Outbreak of *C. auris*, UK Experience

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# Oxford University Hospital and Public Health England

- **Oxford University Hospital NHS Foundation Trust**

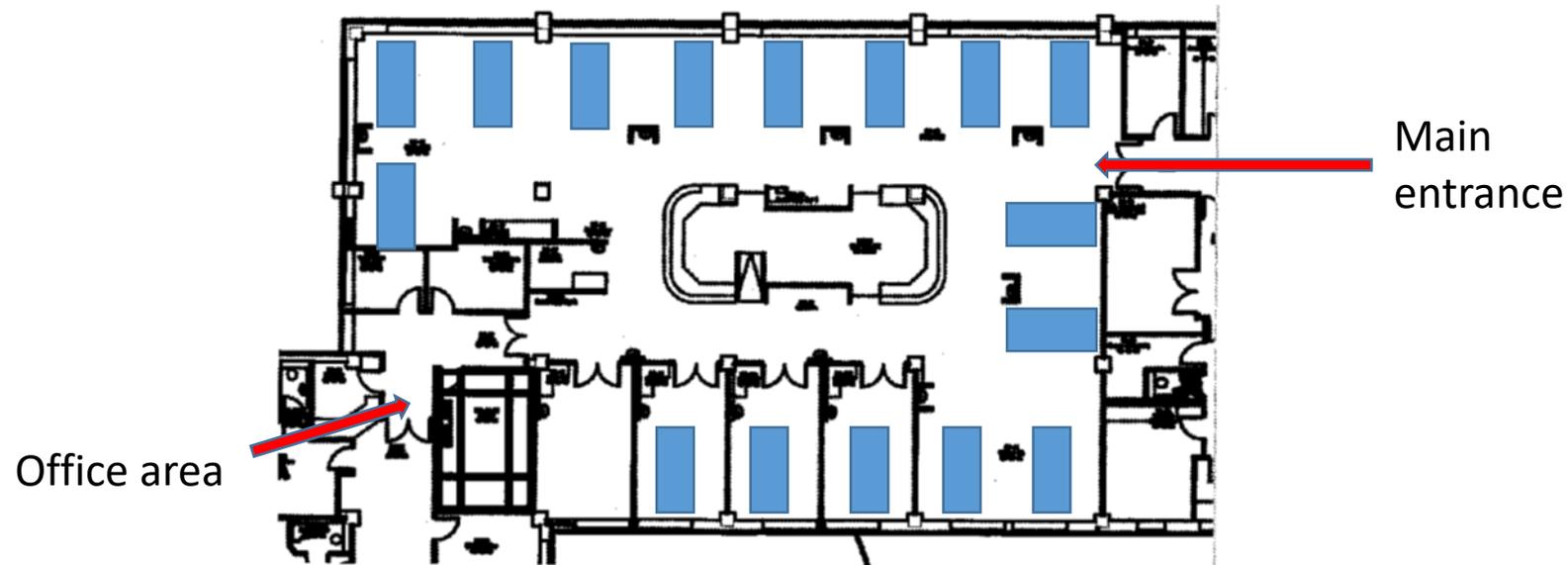
- Large tertiary care University of Oxford teaching hospital
- Provides acute care to ~500,000 people of Oxfordshire
- Offers specialist care up to 5m people depending on service

- **Public Health England**

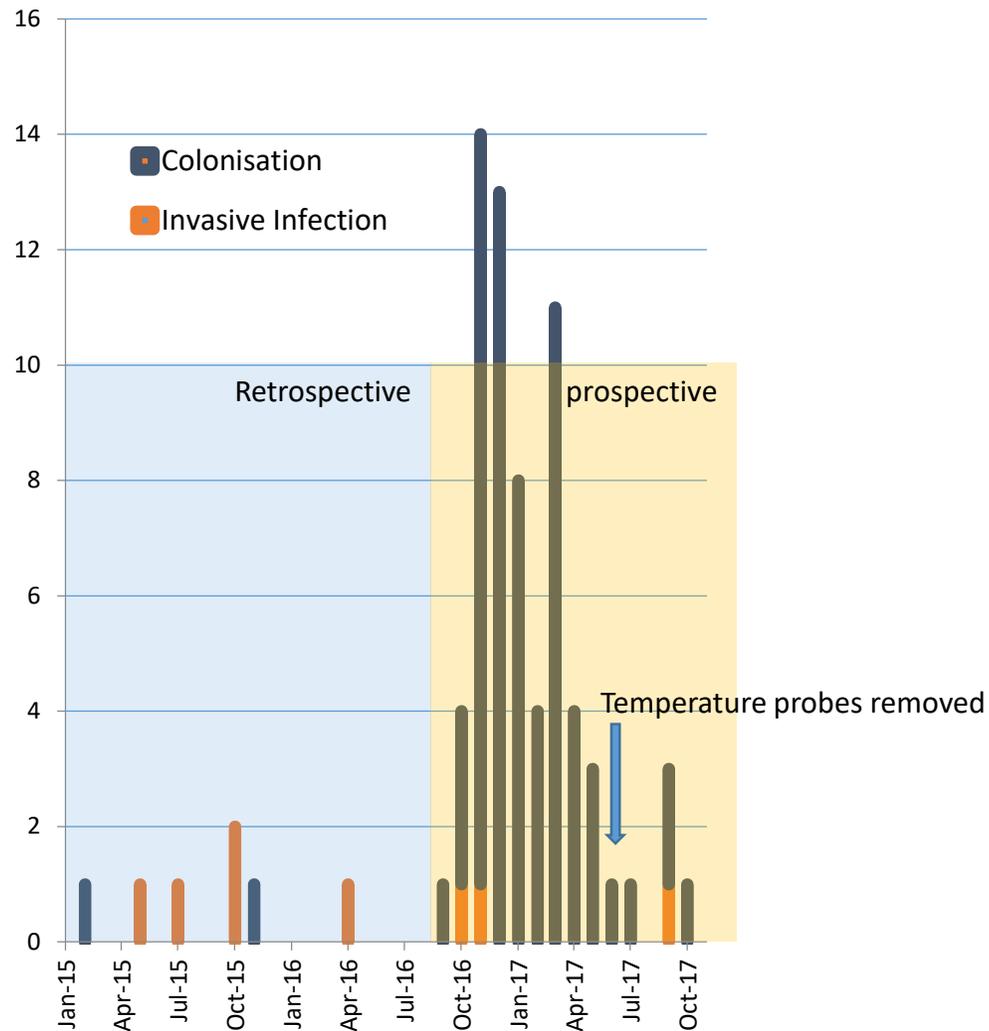
- Provides public health services to the 55m people of England
- The National Infection Service provides communicable disease surveillance, emergency response and prevention services to protect the people of England from infectious diseases

# Neuro-ICU: the setting of the outbreak

- Regional neuro-surgical unit
- 16 beds, 13 open-plan and 3 side-rooms
- 650 admissions/year



# Epidemic curve of the outbreak



- 73 cases of infection/colonisation with *Candida auris*
- 70 cases had in-patient stay on NITU
- All strains typed are 'South African' clone
- 3 with CNS device related infection and 1 pin-site infection (all in 2015)
- 5 candidaemias
- No further cases since October 2017

N Engl J Med 2018;379:1322-31.

# Infection, Prevention and Control Measures

## Operational management of the outbreak

- Regular staff meetings (formal outbreak meetings and informal 'brain-storming')
- Addition of *C. auris* alert to patient transfer form
- Discharge advice on isolation and screening for receiving wards

## Detection of cases, isolation, decontamination or minimise contacts

- Three times weekly screening on NICU and in step-down areas
- Isolation or cohorting of all positive patients. Long sleeved gowns and gloves
- Enhanced clean whole unit daily (Acticlor plus 2000ppm) floors and level surfaces.
- Terminal cleans for all vacated bed-spaces
- Single use equipment where possible e.g. blood pressure cuffs
- Reduction of bedside stocks of equipment, single use items used for patient discarded on discharge

## General control of the environment

- General 'decluttering' of the unit
- Restricted traffic
- Removal of fans and forced air convection blankets

## Other measures

- Environmental screening and whole genome local NIHR Health Protection Research Unit
- Introduction of Micafungin prophylaxis (single dose) for device related surgical procedures in colonised patients

# Independent predictors of *C. auris* colonisation/infection:

Case control study: 66 cases vs 361 controls. Analysis using a multi-variariabile logistic regression

Controlling for length of NICU stay, patient physiology and biomarkers

	Controls (N=361)		Cases (N=66)		Univariate			Multivariate		
	n / median	% / IQR	n / median	% / IQR	Odds ratio	95% Confidence interval	p value	Odds ratio	95% Confidence interval	p value
<b>Axillary temperature monitoring</b>	122	34%	57	86%	12.41	(5.94, 25.90)	<0.001	6.80	(2.96, 15.64)	<0.001

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<b>Any antifungal (fluconazole)</b>	3	1%	3	5%	5.68	(1.12, 28.79)	0.04	10.20	(1.64, 63.47)	0.01

# Skin surface temperature probes (axillary)

Used routinely in ventilated patients for continuous temperature monitoring

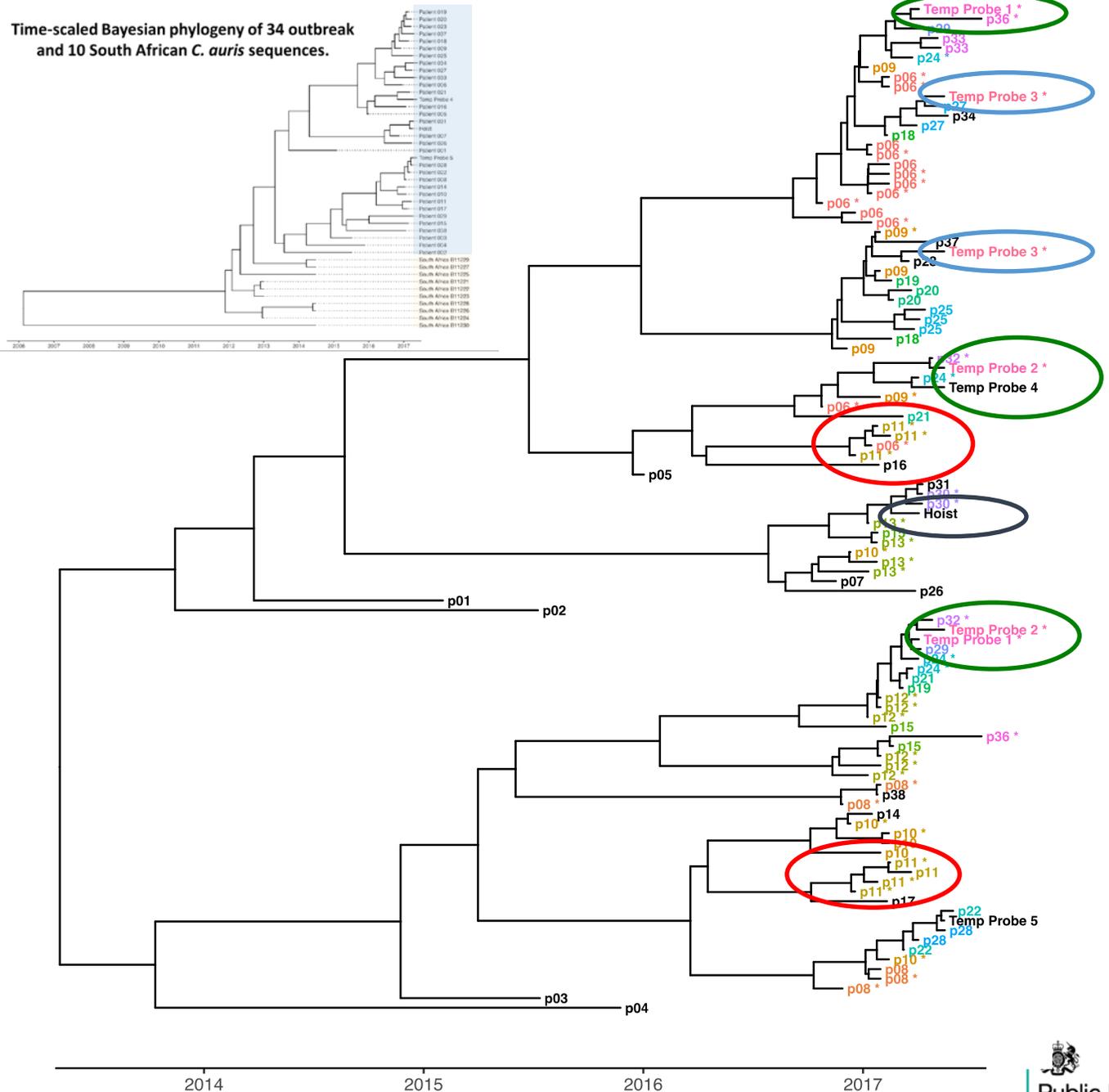


**Air and other device environmental sampling essentially negative**

**Staff not screened – studies in Spain and The Brompton London essentially negative**

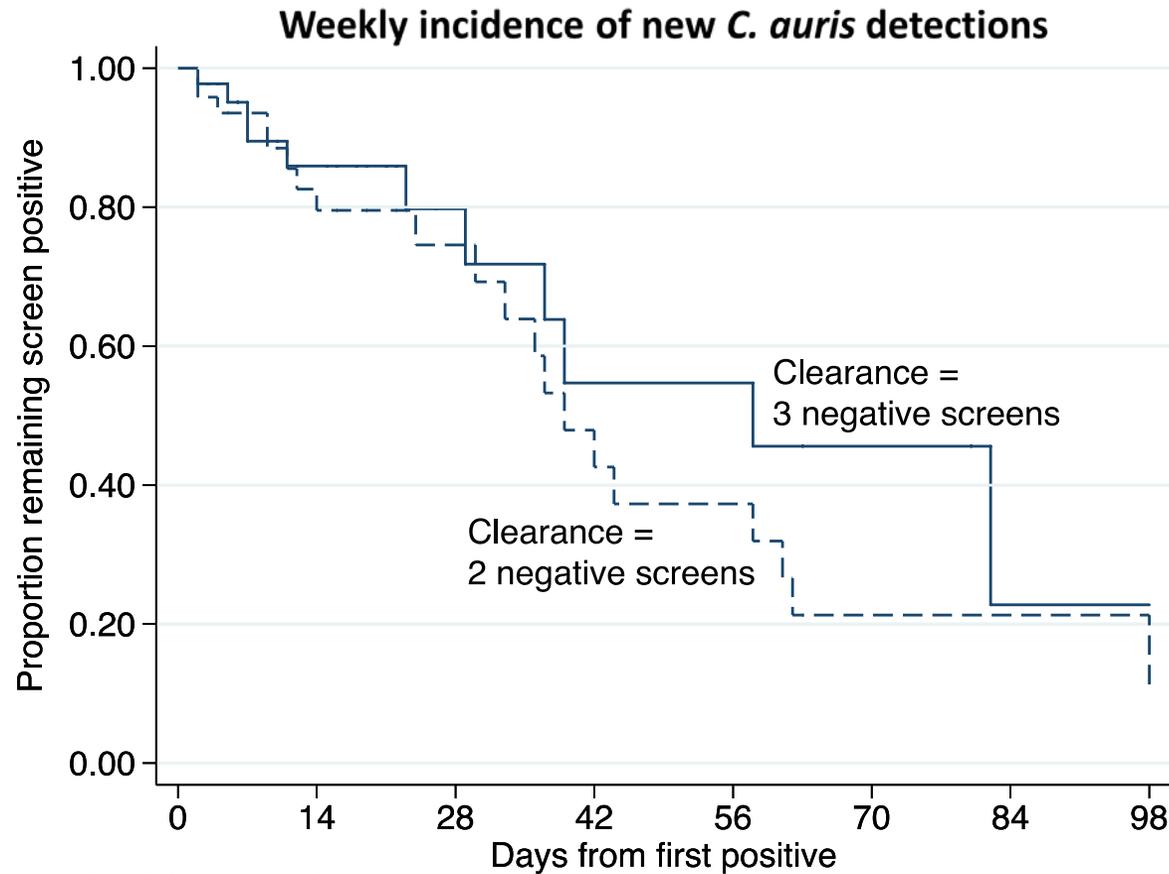
# Whole genome sequenced isolates and population genetics

- Time scaled Bayesian phylogeny of 104 isolates
- First and last isolates
- Isolates from different sites at same time
- For some did multiple picks
- Rate of *C. auris* evolution: 5.75 mutations/genome/year
- South African strain emerged in 2006/2007
- Suggests introduction into Oxford 2013/14
- Colonization/contamination consisted of mixed clades indicating acquisition of multiple lineages



# Duration of *C. auris* colonisation

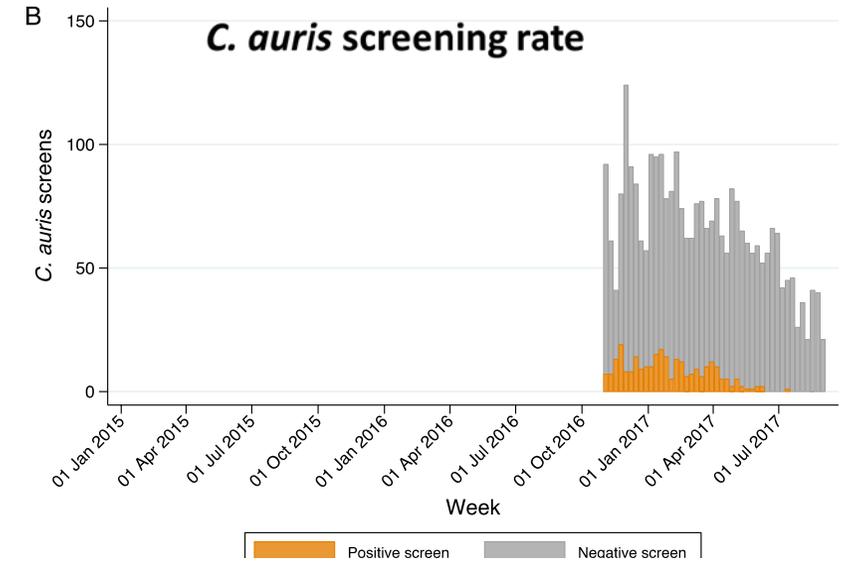
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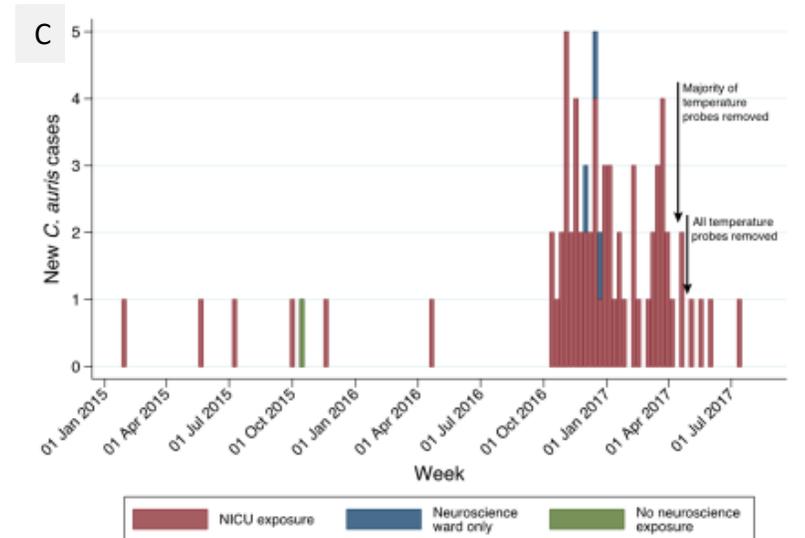
Number at risk (clearances)

3 negatives	44	(5)	23	(1)	10	(3)	6	(0)	6	(1)	3	(1)	1	(0)	1
2 negatives	48	(7)	27	(2)	14	(5)	9	(2)	7	(3)	2	(0)	2	(0)	2

B



**Weekly incidence of new *C. auris* detections**

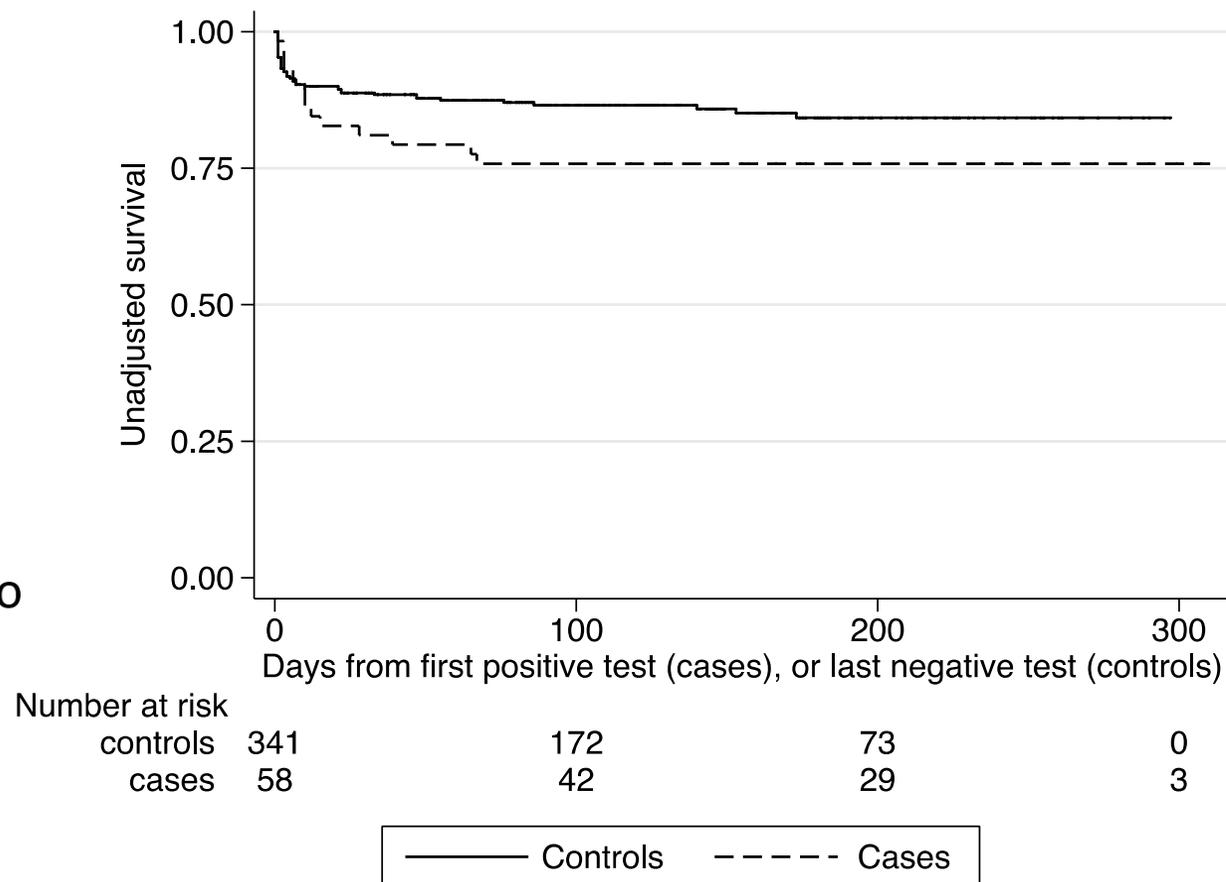


Clearance of colonisation was defined as 2 (dashed line) or 3 (solid line) consecutive negative screens.

# Mortality

- Survival from first-positive (cases) and last-negative screen (controls) was compared using Cox regression adjusting for age, sex, and admission diagnosis.
- 14/58(24%) cases identified after the start of screening died compared with 67/341(20%) controls surviving the day of their last screen
- NO evidence that *C. auris* acquisition was associated with increased mortality (hazard ratio 1.21, 95%CI 0.64-2.29, p=0.55).

## Unadjusted survival for cases and controls identified from 24 October 2016 onwards.



As at this year there have been 260 detections of *Candida auris* recorded, a quarter of which have been clinical infections.

25 hospitals have now recorded a *Candida auris* case, and most cases are colonisation and identified through enhanced surveillance.

Ninety percent of reported cases have been associated with the three outbreak sites, all of which declared their outbreaks over in 2017.

Many of the recent cases have been international hospital transfers, however one outbreak site did have a repeat introduction in the Summer of 2018.

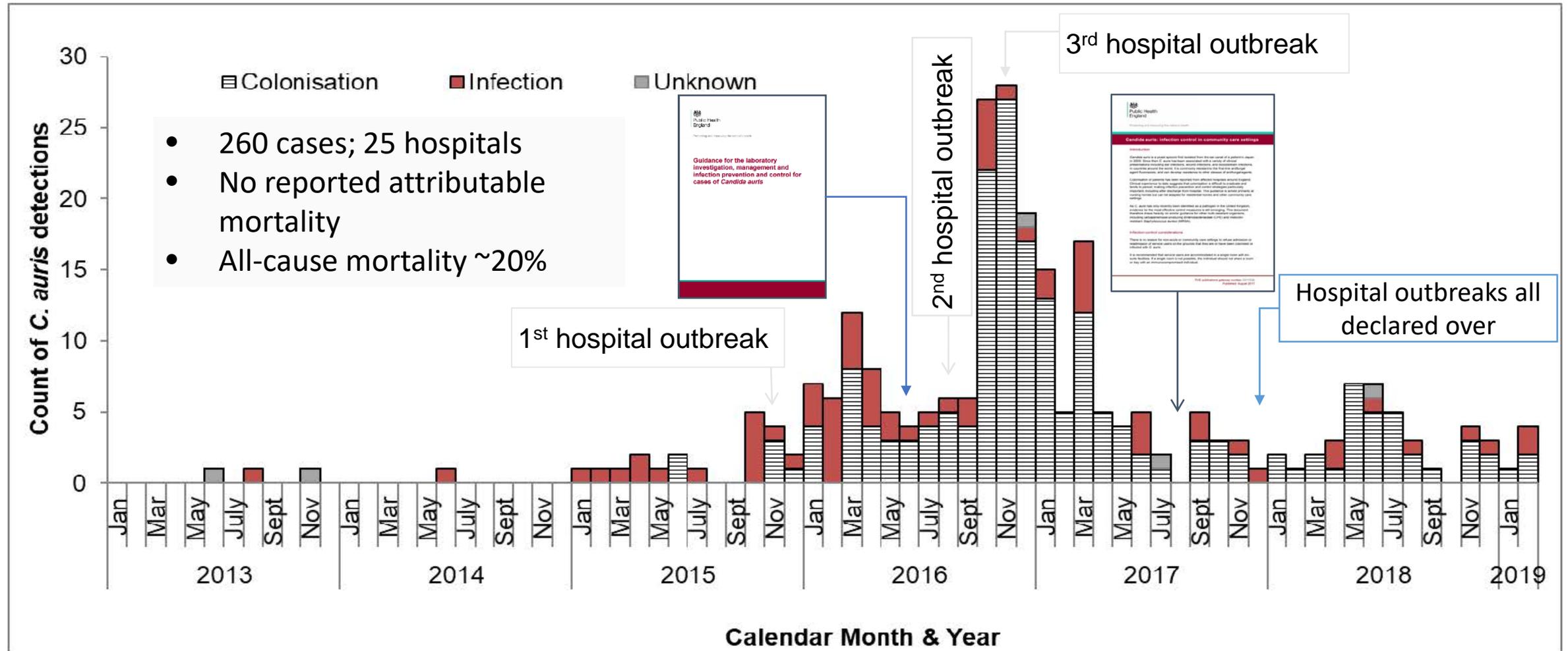
To date there has been no reported attributable mortality in England, and the current all-cause mortality for *C. auris* cases is approximately 20%.

Costs of controlling one of the outbreaks was reported as being more than £1 million.

Further work still needs to be done, To quantify the risks, and assess the control options

What is important that the global network continues to share knowledge, and keep each other apprised of ongoing situations.

# England National Incident curve



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