

# Using OPAT to drive paediatric antimicrobial stewardship

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# Paediatricians have been ambulating children on IVAbs for years!

45 / year  
in Wessex

Children with complex infections requiring long courses of antibiotics in tertiary centres (small numbers) – e.g. the child with endocarditis

>2000 / year  
in Wessex

Children with common infections requiring relatively short courses of antibiotics discharged from general paediatric wards (moderate numbers) – e.g. the stable child with pyelonephritis

Children with possible bacterial infection ambulated directly from short-stay units or paediatric emergency departments – e.g. the febrile but stable child with a petechial rash (large numbers)

# Why are children prescribed IVAbs?

- ARPEC study – Two one-day point-prevalence surveys (September 2011 and November 2012 )
- Antibiotic prescribing in 61 UK paediatric units.



Versporten A et al. *Pediatr Infect Dis J.* 2013 Jun;32(6)

# IVAb use in secondary care settings

|  | General Hospitals<br>N children on antibiotics=349 (18%)<br>N antibiotic prescriptions=479 |
|--|--|
| Age Median (IQR)                         | 2 (0.8, 6)   |
| PICU n children (%)                      | 4 (1%)   |
| Surgery n children (%)                   | 18 (5%)  |
| Underlying disease n (%)                 | 151 (43%)  |
| N children with $\geq 2$ antibiotics (%) | 122 (35%)  |

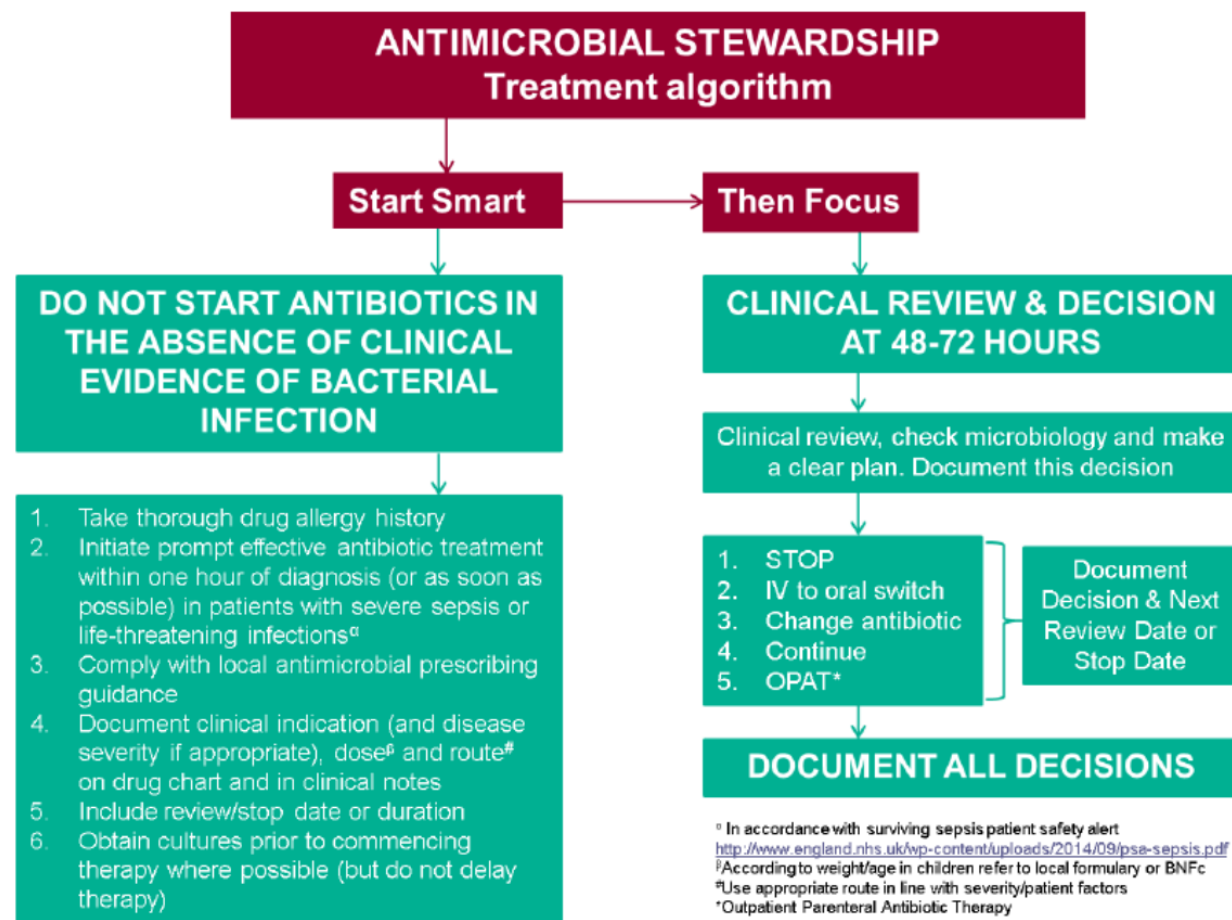
Versporten A et al. Pediatr Infect Dis J. 2013 Jun;32(6)

# IVAb use in secondary care settings (UK)

|  |   |
|--|---|
|  | <b>General Hospitals</b><br>No children on<br>antibiotics=103 (15%)<br>No antibiotic<br>prescriptions=131 |
| No (%) hospital acquired<br>infections                                     | 1 (1%)  |
| Narrow spectrum<br>antibiotics<br>No (%) prescriptions                     | 37 (28%)  |
| 3rd generation<br>cephalosporin + co-<br>amoxiclav<br>No (%) prescriptions | 55 (42%)  |
| Meropenem<br>No (%) prescriptions  | 3 (2.3%)  |

Versporten A et al. Pediatr Infect Dis J. 2013 Jun;32(6)

# Do we know what 'good' Ab prescribing looks like in children?



# Do we know what 'good' Ab prescribing looks like in children?

## NICE

National Institute for  
Health and Care Excellence

If afebrile, clinically improving and  
inflammatory markers improving, can  
switch to oral Abs.

### Antibiotic duration and timing of the switch from

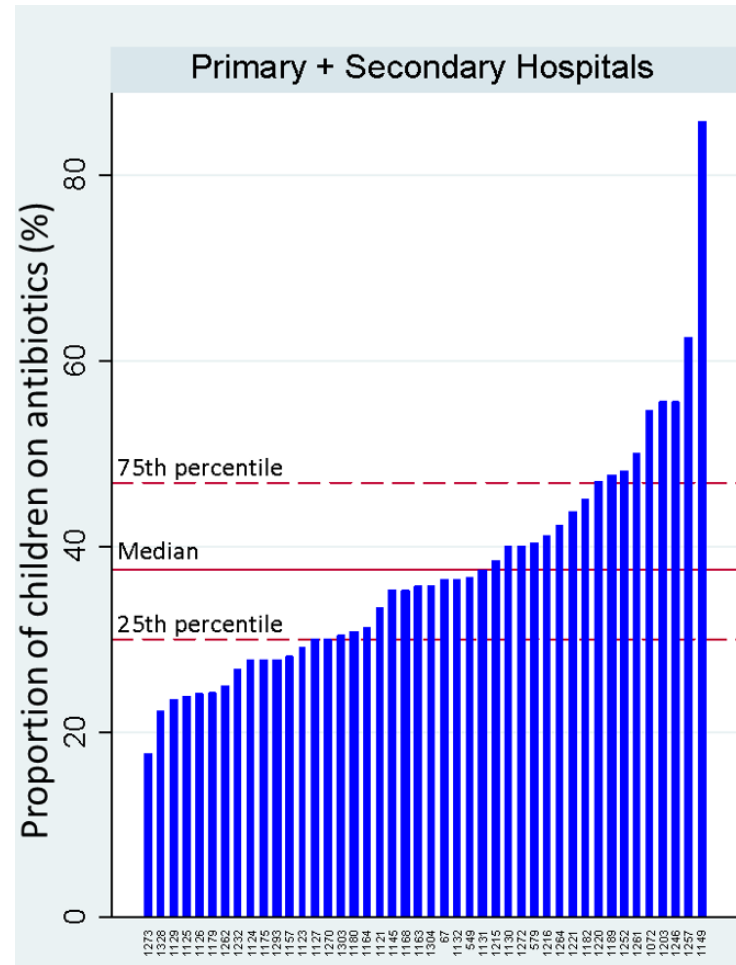
intravenous to oral route for bacterial infections in children

Sepsis: recognition, diagnosis and early management [NG51]  
systematic review and guidelines

Neonatal infection (early onset): antibiotics for prevention  
and treatment

[Lancet Infect Dis.](#) 2016 Aug;16(8):e139-52

# What do we know about the quality of IVAb prescribing in children?



Versporten A et al.  
Pediatr Infect Dis J.  
2013 Jun;32(6)

# What do we know about the quality of prescribing in children being ambulated on IVAbs?

- Predominantly US data (retrospective):
  - A significant proportion should have been started on oral Abs rather than IVAbs
    - Pneumonia 17.6%, cellulitis 24%, UTI 27%<sup>1</sup>
  - Of those appropriately started on IVAbs:
    - 11.4% prescribed the incorrect IVAb dose<sup>2</sup>
    - 28% continued inappropriately on IVABs at 48 hours
      - 14% should have been stopped, 14% oral switch<sup>3</sup>

1. Xu M et al. Pediatr Emer Care 2017

2. Akar A et al. Clin Pediatrics 2014

3. Knackstedt E et al. Hosp Epidemiology 2015

# Antibiotic Stewardship and IV Ambulation in Southampton Children's Hospital – opportunities for improvement

Emily Tanner

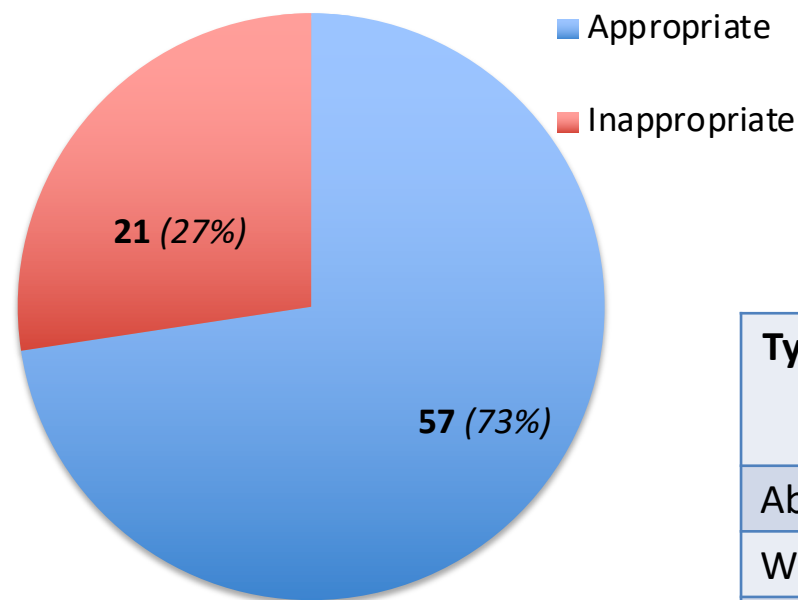
# Aims

- Compare antibiotic stewardship for children with common presentations on short course IV antibiotics before and after the introduction of a formal ambulatory pOPAT service
- Look at further opportunities for ambulation and the impact of a more efficient OPAT service

# Methodology

- Inclusion criteria
  - Secondary care general paediatric patients started on IVABs
  - Excluded patients requiring surgical interventions and tertiary patients
- Data collection sheets
- Ward rounds (three times per week) and daily assessment unit/OPAT clinic recruitment
- Communication with OPAT team
- Weekly review of patients by 2 consultants

# Antibiotic management at presentation (2018)



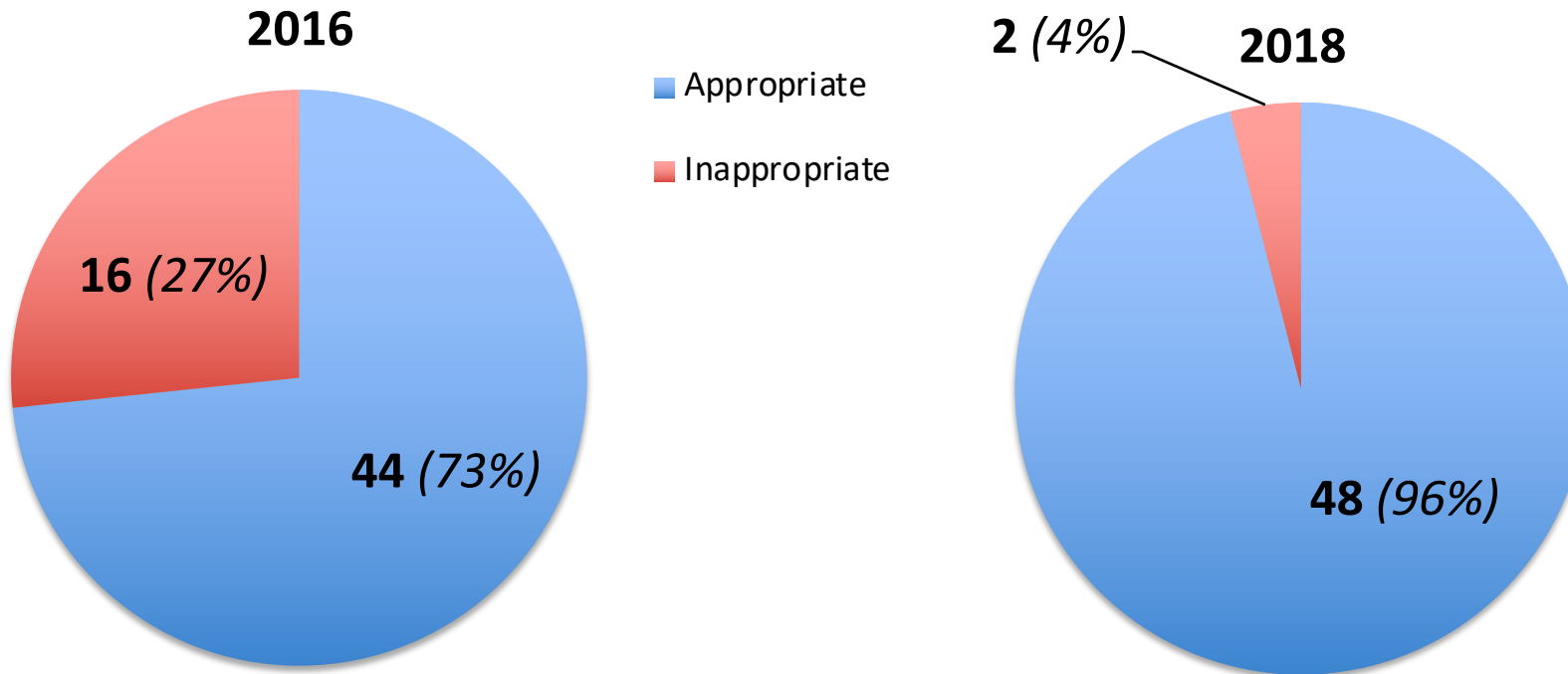
**27% of children started on IVAbs had suboptimal Ab management at presentation**

| Type of mismanagement at presentation | Number of Patients |
|---------------------------------------|--------------------|
| Abs not indicated                     | 9 (43%)            |
| Wrong route (oral )                   | 9 (43%)            |
| Wrong antibiotic (too broad)          | 2 (10%)            |
| Wrong dose                            | 1 (5%)             |

# Working diagnosis where antibiotics “not indicated”

| Working Diagnosis                 | Number of Patients |
|-----------------------------------|--------------------|
| Lower Respiratory Tract Infection | 6                  |
| Upper Respiratory Tract Infection | 1                  |
| Gastroenteritis                   | 1                  |
| Fever without source              | 1                  |

# Antibiotic management at 48 hours



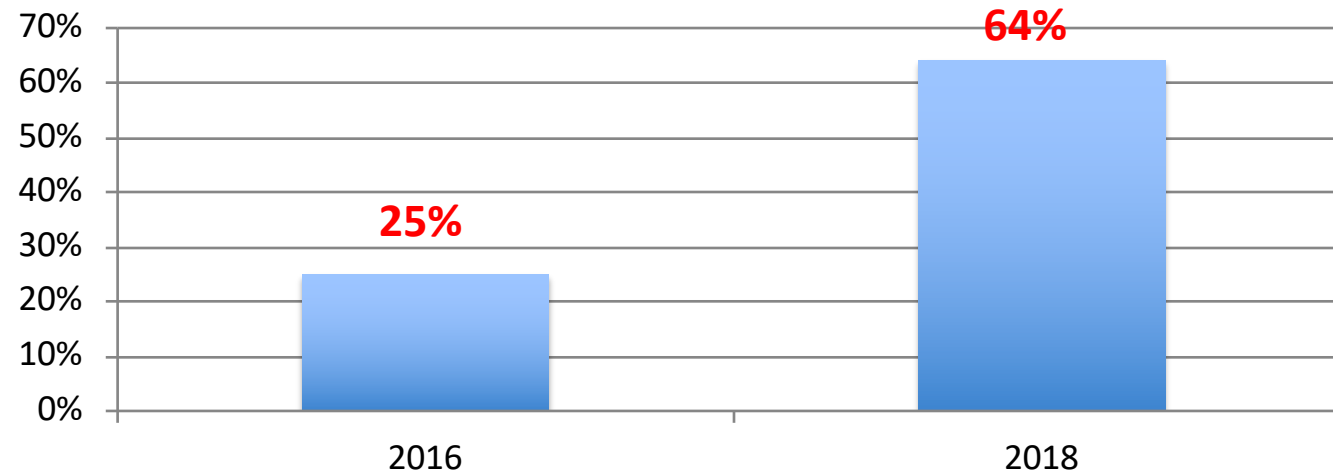
# Antibiotic management at 48 hours

| <u>2016</u>                     |                    | <u>2018</u>                     |                    |
|---------------------------------|--------------------|---------------------------------|--------------------|
| Suboptimal management           | Number of Patients | Suboptimal management           | Number of Patients |
| Oral Switch Indicated           | 3                  | Should Have Stopped Antibiotics | 2                  |
| Should Have Stopped Antibiotics | 11                 |                                 |                    |
| Inappropriate Course Length     | 2                  |                                 |                    |

# Rates of Ambulation

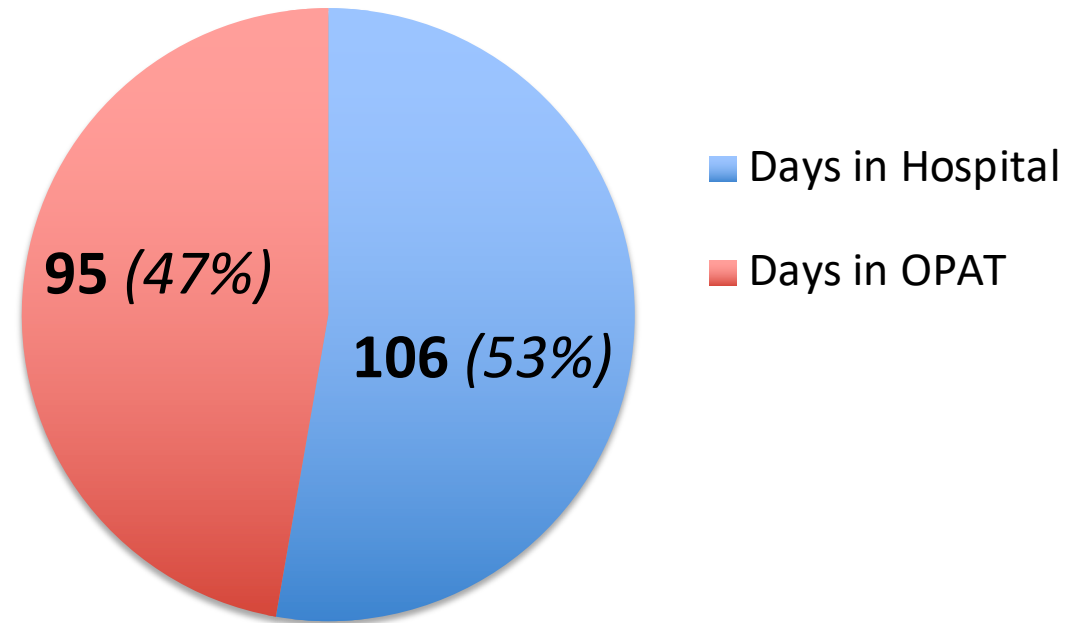
|                               | 2016 | 2018 |
|-------------------------------|------|------|
| <b>Patients Ambulated</b>     | 17   | 49   |
| <b>Patients Not Ambulated</b> | 50   | 28   |

Percentage of Patients Ambulated



# Impact of OPAT on inpatient bed days

## OPAT vs Inpatient Days (2018)



# Admission Avoidances

|      | <b>Admission Avoidances</b> | <b>Total Number of Patients Ambulated</b> | <b>Admissions avoided (%)</b> |
|------|-----------------------------|---|-------------------------------|
| 2016 | 6                           | 17  | 35%                           |
| 2018 | 21                          | 49  | 43%                           |

# Increasing OPAT Efficiency

| Potential impact of optimizing the pOPAT service (based on 2018 Data) |                  |          |                              |
|---|------------------|----------|------------------------------|
|   | Absolute numbers | % change | 12 Month Estimate            |
| Potential Admission Avoidances  | 7                | ↑33%     | 41 extra admissions avoided  |
| Potential Bed Days Saved  | 16               | ↓16%     | 93 extra bed days saved      |
| Potential IV Antibiotic Courses Avoided                               | 18               | ↓23%     | 104 courses of IVAbs avoided |
| Potential OPAT Opportunities  | 4                | ↑8%      | 23 extra patients ambulated  |

# Limitations

- Period of data collection only 9 weeks
- Small sample size

# Learning points For a medical student

- Number of patients on antibiotics
- Need for understanding how to prescribe appropriately – need to be taught as part of undergraduate curriculum
- People find it hard to ‘do nothing’
  - Observation if not ‘doing nothing’
  - Child with a petechial rash and children triggering the sepsis screening tool
- The introduction of the ambulatory pOPAT service has improved Ab management across Southampton children’s hospital – has driven behaviour change
- Impact of OPAT on families and children

# Next steps

- Develop clear pathways for common presentations:
  - Criteria for OPAT versus admission & treatment guidelines
    - tonsillitis
  - More complex presentations:
    - Petechial rashes, children triggering a sepsis screening tool, fever in babies < 3 months of age
- Rolling out pOPAT to DGHs/secondary care hospitals:
  - Need to articulate the benefits of ambulatory pOPAT including **cost saving** (admission avoidance and ↓LOS), **patient safety**, **improved Ab stewardship** and **patient satisfaction**
  - Promote the role of paediatricians with an interest in infection