Improving intravenous-to-oral antibiotic switch in children: a team-based audit and implementation approach

Supplementary Appendix: Project Resources

care, advocacy, research, education

Infection	Minimum IV antibiotic duration	Criteria for switch to oral antibiotic	Minimum total antibiotic duration	Notes
Musculoskeletal infections				
Acute osteomyelitis	Uncomplicated: 3-4 days [A-I]	Afebrile, clinical improvement, CRP/ESR decreasing [A-II]	3-4 weeks [A-II] Complicated (delayed presentation, associated wound or abscess): longer duration IV is likely to be required [D-expert opinion]	If associated bacteraemia, initial IV but may be shortened to 4-7 days if improving quickly and uncomplicated, with remainder oral for total duration as for non-bacteraemic infection [C-III]
Subacute or chronic osteomyelitis	Clinically well and no prosthetic material: 0 days [D-expert opinion] Prosthetic material: initial treatment [D-expert opinion]	As soon as tolerated Clinical improvement [D-expert opinion]	There is no evidence to support a minimum total duration There is no evidence to support a minimum total duration	If prosthetic material is present, biofilm active antibiotics for a long duration are likely to be necessary [D-expert opinion]. Cure may not be possible without prosthetic material removal
Septic arthritis	2-4 days [A-II]	Afebrile, clinical improvement, CRP/ESR decreasing [A-II]	2-3 weeks [A-II] Complicated (delayed presentation, associated wound or abscess): longer duration IV is likely to be required [D-expert opinion]	If associated bacteraemia, initial IV but may be shortened to 4-7 days if improving quickly and uncomplicated, with remainder oral for total duration as for non-bacteraemic infection [C-III]
Pyomyositis	2-5 days [C-IV]	Clinical improvement	2-3 weeks [C-IV]	Pus should be drained [C-IV]
Skin and soft tissue infections				
Cellulitis	Mild: 0 days Moderate/severe*: 1-3 days [C-IV]	Clinical improvement – fever and erythema reduction	5-7 days [C-IV]	If associated deep infection or osteomyelitis, refer to the relevant guideline *Moderate/severe: rapidly spreading erythema, tender, lymphangitis, systemic features
Preseptal (periorbital) cellulitis	2-3 days [C-IV]	Clinical improvement in fever and erythema	7-10 days [C-IV]	Nil
Orbital cellulitis	3-4 days [C-IV]	Clinical resolution of fever, erythema and pain	7-10 days [C-IV]	Intra-orbital abscesses should be drained, with non-operative management in selected patients [C-IV]. If symptoms persist IV antibiotics should continue while investigating for complications [D-expert opinion]

Figure A1: Excerpt from hospital policy introduced at project commencement, available on hospital intranet

IV to Oral Conversion

Can your patient be converted to oral antimicrobials?

Inclusion criteria

- ✓ *Clinically stable*
- ✓ *Able to tolerate oral medication*
- ✓ *Suitable oral alternative available in palatable paediatric formulation*
- ✓ *Patient likely to be adherent with oral therapy*
- ✓ *Family agrees with the plan*

Exclusion Criteria:

- × *Septic*
- × *Endocarditis*
- × *Meningitis*
- × *Malabsorption*
- × *Severe diarrhoea*
- × *Uncontrolled nausea and vomiting*
- × *Neonate (not an absolute contraindication, discuss with AMO)*

Full guideline available on the intranet
Policy Number 2017-044
Sydney Children's Hospital Randwick
May 2017

SYDNEY CHILDREN'S HOSPITAL RANDWICK
The Sydney Children's Hospitals Network

Check MICROBIOLOGY results at 24 hours and CHOOSE ORAL THERAPY according to susceptibilities.

Do NOT use suggested doses below for NEONATES. Do NOT exceed ADULT DOSE.

If on: **IV antibiotic and dose**	**Suggested PO conversion**
Ampicillin/Amoxicillin 25-50 mg/kg/dose 6-hourly	Amoxicillin 15-25 mg/kg/dose 8-hourly
Benzylpenicillin 30-60 mg/kg/dose 6-hourly	Amoxicillin (dose as above) OR Phenoxymethylpenicillin 10-12.5 mg/kg/dose 6-hourly
Cefotaxime *(restricted)* 25-50 mg/kg/dose 6-to-8-hourly	Amoxicillin-Clavulanic acid (*Augmentin Duo400®*) 22.5 mg/kg/dose (amoxicillin component) 12-hourly If treating a Pseudomonas or resistant Gram negative infection, seek ID advice
Ceftriaxone *(restricted)* 50-100 mg/kg/dose 24-hourly	
Piperacillin-Tazobactam *(restricted)* 100 mg/kg/dose (piperacillin component) 6-to-8-hourly	
Ampicillin 25-50mg/kg/dose 6-hourly PLUS Gentamicin 7.5mg/kg/dose 24-hourly PLUS Metronidazole 12.5 mg/kg/dose 12-hourly	
Clindamycin *(restricted)* 10-15 mg/kg/dose 8-hourly	Clindamycin *(restricted)* 7.5-10mg/kg/dose 8-hourly
Flucloxacillin 25-50 mg/kg/dose 6-hourly	Flucloxacillin 12.5-25 mg/kg/dose 6-hourly OR Cefalexin 12.5-25 mg/kg/dose 6-hourly

Figure A2: Lanyard card with IV-oral conversion inclusion criteria and prescribing advice

PROJECT SWITCH

Promoting IV to oral antibiotic switch to improve patient care

KEY INFORMATION FOR CLINICIANS ON SWITCHING TO ORAL ANTIBIOTICS

Indications for oral antibiotics

It is safe and appropriate to treat a range of infections with oral antibiotics, including:

- community-acquired pneumonia
- cellulitis
- lower urinary tract infections
- step-down therapy for complicated appendicitis and intra-abdominal infections

Full guideline available on the SCHN intranet, Policy Number 2017-044

Can your patient be converted to oral antimicrobials?

Inclusion criteria

- ✓ Clinically stable
- ✓ Able to tolerate oral medication
- ✓ Suitable oral alternative available in palatable paediatric formulation
- ✓ Patient likely to be adherent with oral therapy
- ✓ Family agrees with the plan

Exclusion criteria:

- × Septic
- × Endocarditis
- × Meningitis
- × Malabsorption
- × Severe diarrhoea
- × Uncontrolled nausea and vomiting
- × Neonate (not an absolute contraindication, discuss with AMO)

Still unsure? Contact the Infectious Diseases team for further advice.

Acknowledgement - The Clinical Excellence Commission acknowledges the staff of Sydney Children's Hospitals Network, particularly staff within Sydney Children's Hospital, Randwick who have partnered with us on this improvement project.

If on: IV antibiotic and dose	Suggested PO conversion*
Ampicillin/Amoxicillin 25-50 mg/kg/dose 6-hourly	Amoxicillin 15-25 mg/kg/dose 8-hourly
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Cefotaxime *(restricted)* 25-50 mg/kg/dose 6-to-8-hourly	Amoxicillin-Clavulanic acid (*Augmentin Duo400*®) 22.5 mg/kg/dose (amoxicillin component) 12-hourly If treating a *Pseudomonas* or resistant Gram negative infection, seek ID advice
Ceftriaxone *(restricted)* 50-100 mg/kg/dose 24-hourly	
Piperacillin-Tazobactam *(restricted)* 100 mg/kg/dose (piperacillin component) 6-to-8-hourly	
Ampicillin 25-50 mg/kg/dose 6-hourly **PLUS** Gentamicin 7.5 mg/kg/dose 24-hourly **PLUS** Metronidazole 12.5 mg/kg/dose 12-hourly	
Clindamycin *(restricted)* 10-15 mg/kg/dose 8-hourly	Clindamycin *(restricted)* 7.5-10 mg/kg/dose 8-hourly
Flucloxacillin 25-50 mg/kg/dose 6-hourly	Flucloxacillin 12.5-25 mg/kg/dose 6-hourly **OR** Cefalexin 12.5-25 mg/kg/dose 6-hourly

***Check microbiology results at 24 hours and choose oral therapy according to susceptibilities.**

Do NOT use suggested doses above for NEONATES.

SYDNEY CHILDREN'S HOSPITAL RANDWICK
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CLINICAL EXCELLENCE COMMISSION

Figure A3: Poster for Clinicians

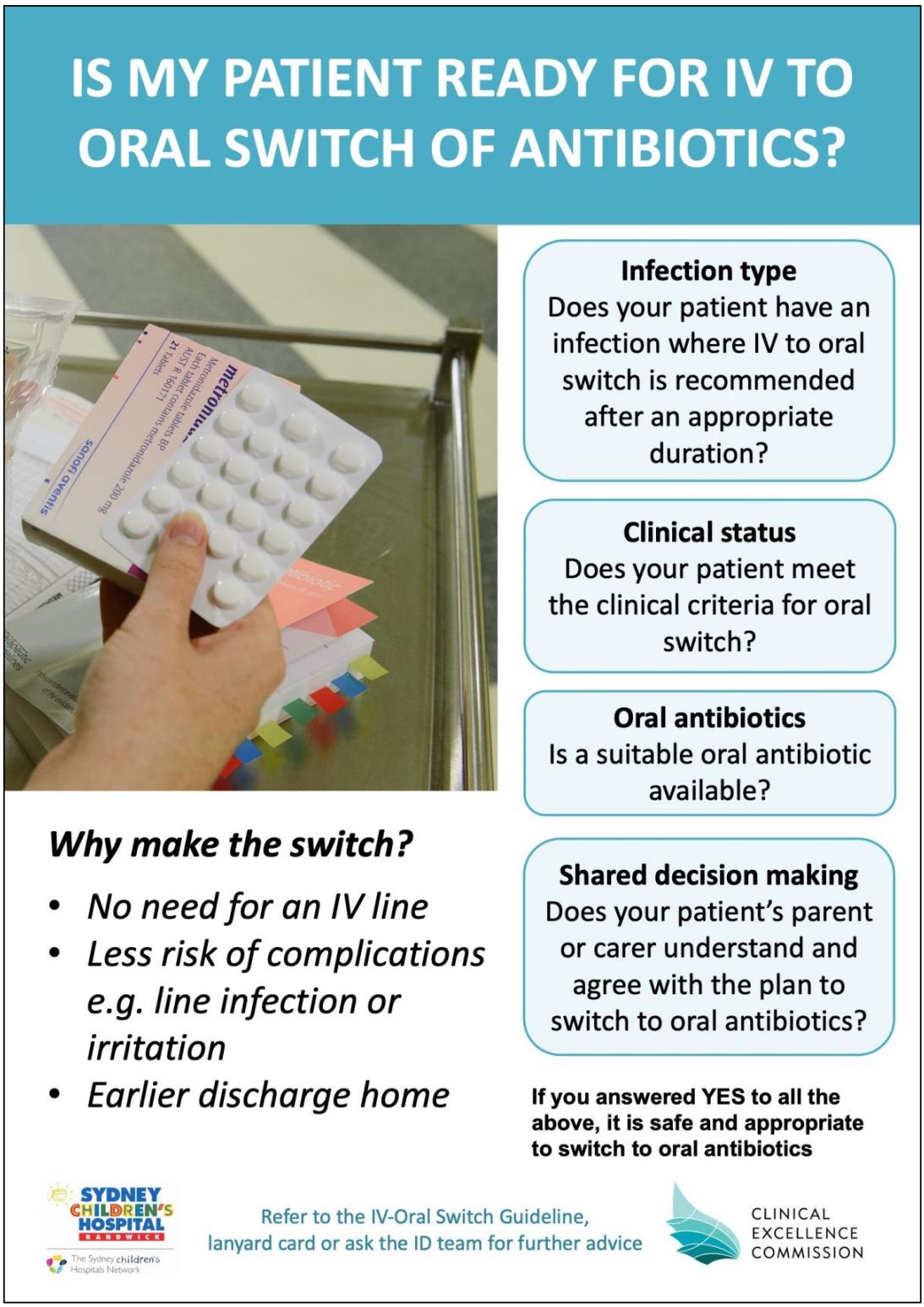

Figure A4: Promotional Poster

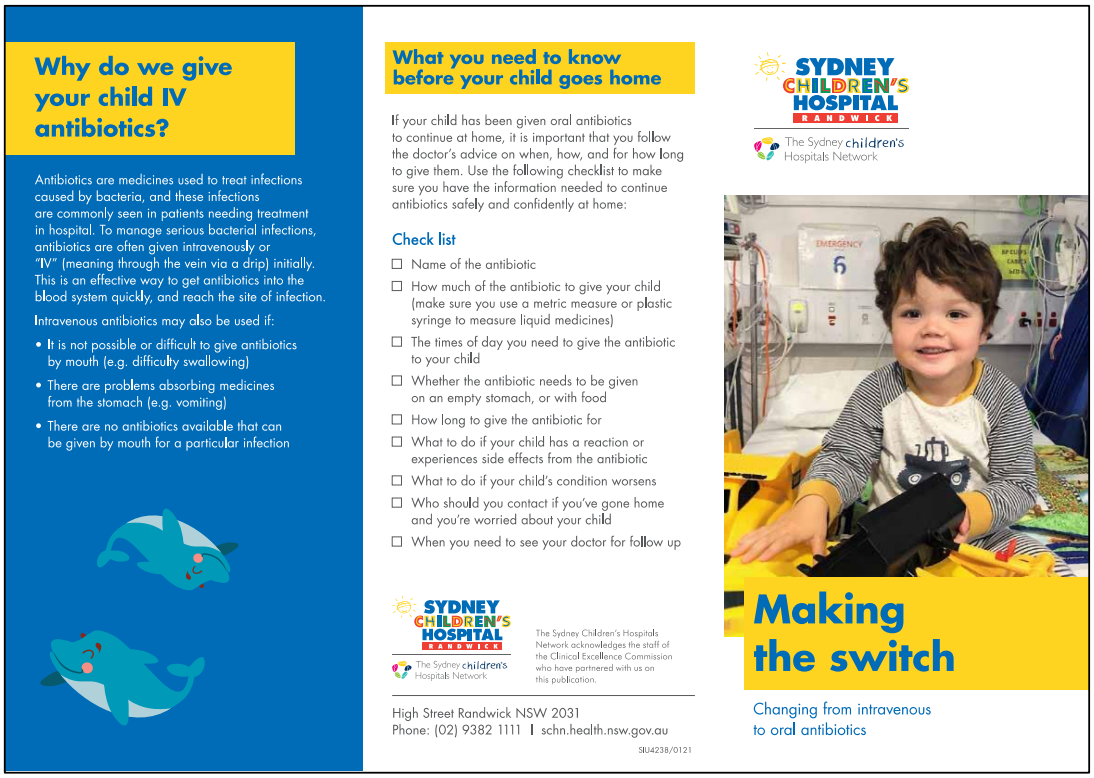

Figure A5: Parent/Carer Factsheet with Discussion Checklist

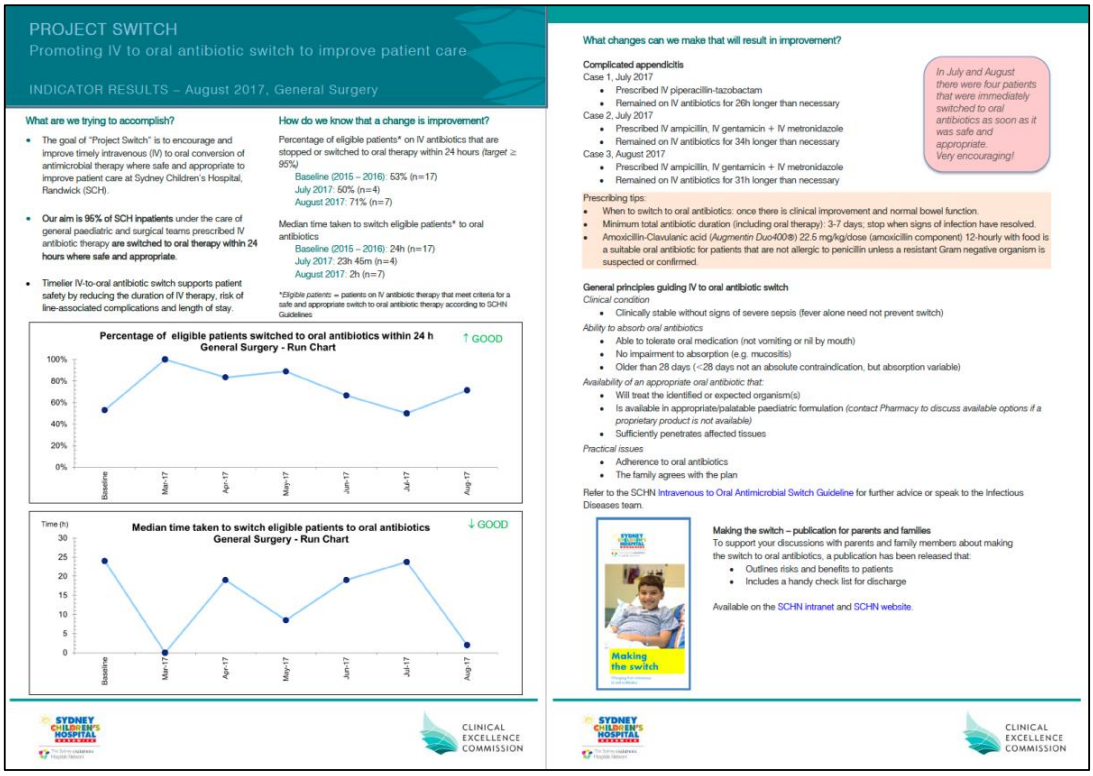

Figure A6: Example Tailored Report for Surgical Team