

The Elastomeric Pump – Is it a godsend?

Alice Liu
Antimicrobial Pharmacist
September 2023



Background

- Asked to look for area to save bed-days
- Easy and Simple
- Don't need to go through numerous boards to get the approval
- **CHEAP!**

TATU (Trauma Assessment and Treatment Unit)

- A 6-bed bay linked to T&O ward with reclining chairs
- Operated by the on-call T&O SpR and a staff nurse
- 7 days a week (no overnight stay)
- Mainly ED or GP referrals
- Promote early hospital T&O discharge (Day Case)
- Aim – to avoid hospital admission

PDSA 1

- Started since May 2022
- Day Case patient
- Moderate soft skin and tissue infection
- Treatment: **Flucloxacillin** 2g iv stat; followed by 8g iv over 24 hours via elastomeric pump (BBraun Easypump II)

PDSA 1 – Exclusion criteria

- Patient/carer unable to read or write
- Patient/carer unable to speak English and does not have access to a suitable translation service
- Patient/carer unable to comply with training
- Patient or carer has a previous or current history of substance abuse
- More than two intravenous medications required
- Patient cannot access the phone for emergency
- Patients with injuries compromising their dexterity thus prohibiting their ability to look after the IV lines and the IV antimicrobial therapy (BBraun Easypump II).

PDSA 1 – Decision Making Process

- Consultant or SpR on duty assesses the patient's "suitability" to receive the IV elastomeric pump at home
- Nursing staff explains the procedure and associated risk
- **Both** consultant and nursing staff agree that the patient can manage the treatment
- Obtain patient consent – Patient has to agree to come to TATU daily for clinical assessment and change the pump
- Arrange vascular team for midline or PICC line insertion
- Receive the stat dose of flucloxacillin 2g

PDSA 1 – Audit Result

- 13 patients
- Total admission days saved = 46
- Mean duration of Abx for soft tissue infections = 3.5 days
- 1 patient had a total of 13 days for the PJI/Spinal infection
- Excellent patient feedback

PDSA 2 – Self Care Model via Virtual Ward

- Launched end of April 2023
- Same assessment format as PDSA 1
- **Difference:**
 - Patients apply the IV antibiotic pumps themselves at home
 - Pumps are made in TATU and delivered to patients' home via hospital taxi service
 - Patients reviewed in TATU every 48 hours
 - Patients provided with advice (safety netting) if clinically deteriorating

PDSA 2 – Audit Result

- 20 patients: 11 (Virtual); 9 (day case)
- Mean Age = 53 (25-76)
- Total admission days saved = 109
- 16 patients treated for SSTIs
- 2 patients for osteomyelitis; 1 patient for infected spinal wound following foraminotomy; 1 patient for suspected R knee septic arthritis
- 17 patients referred from ED/MIU; 9 patients – 2nd ED admission due to failure of oral antibiotics

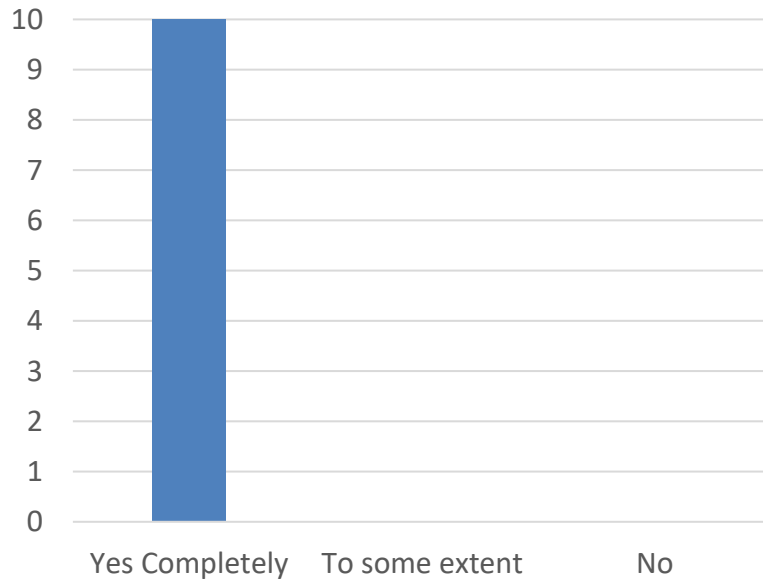
PDSA 2 – Audit Result

- 16 patients discharge from TATU with high dose flucloxacillin 1g po qds after IVAB.
- 1 patient had adverse drug reaction with flucloxacillin after 5 day IV (rash) – change to oral doxycycline
- 1 patient changed abx (daptomycin + ciprofloxacin) upon micro advice for R hip osteomyelitis
- 1 patient stopped IVAB as no signs of infection (pseudogout)
- 1 patient readmitted to hospital for debridement and washout +/- Vac dressing +/- primary closure due to necrosis and surrounding sloughy tissues on R elbow

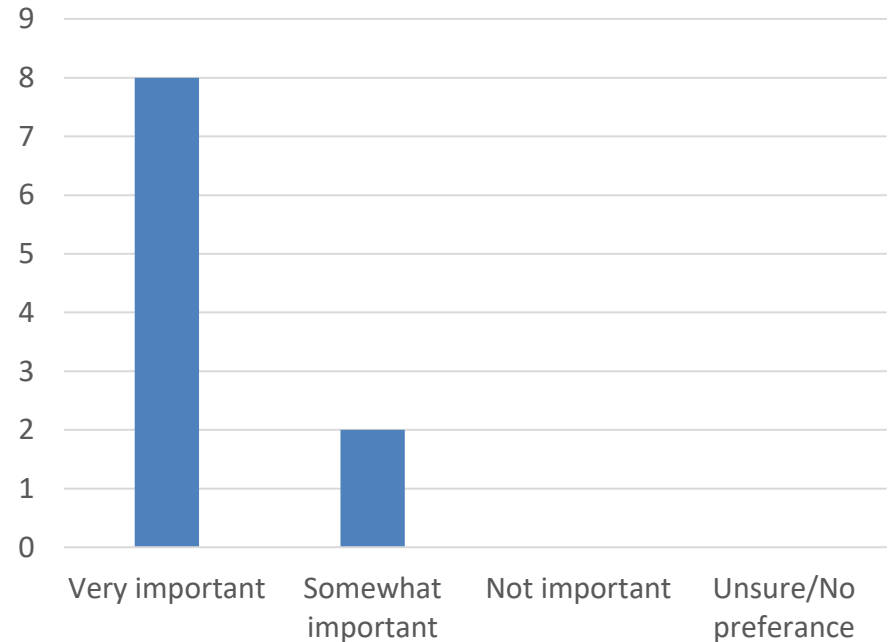
Results PDSA 2 – Patient Feedback

(N=10)

Q1. Were you happy to have your antibiotic therapy at home?

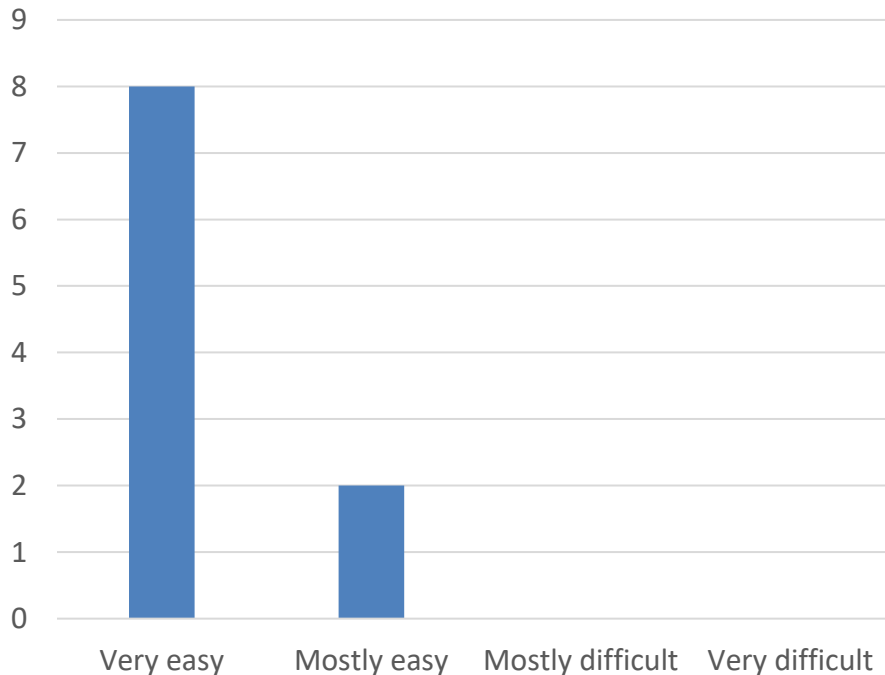


Q2. How important to you was it to be able to receive your treatment at home?

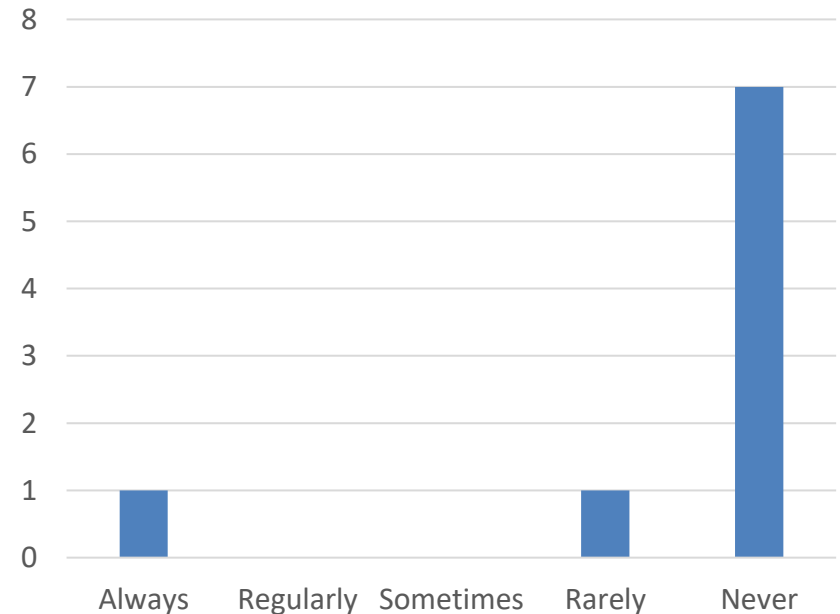


Results PDSA 2 – Patient Feedback

Q3. How did you find attaching the pump?

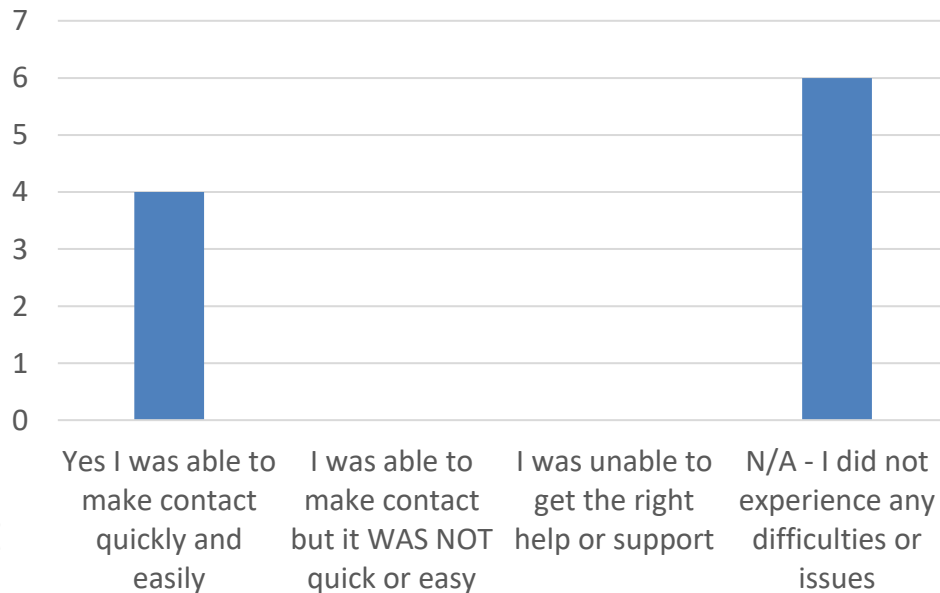


Q4. Did you experience any difficulties when using the pump

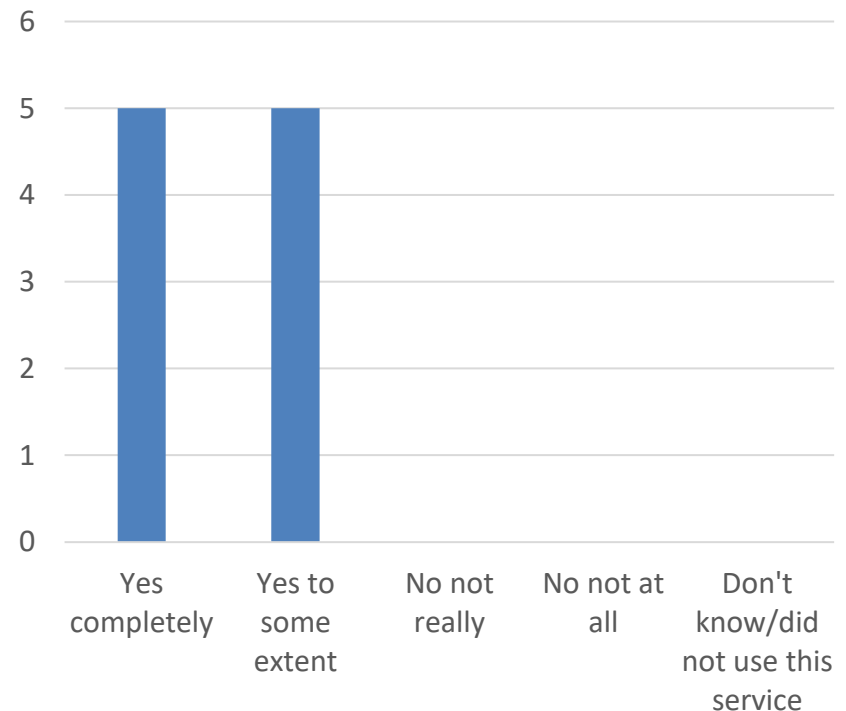


Results PDSA 2 – Patient Feedback

Q5. If you did experience any issues or difficulties with the pump, were you able to get in touch with someone to help?

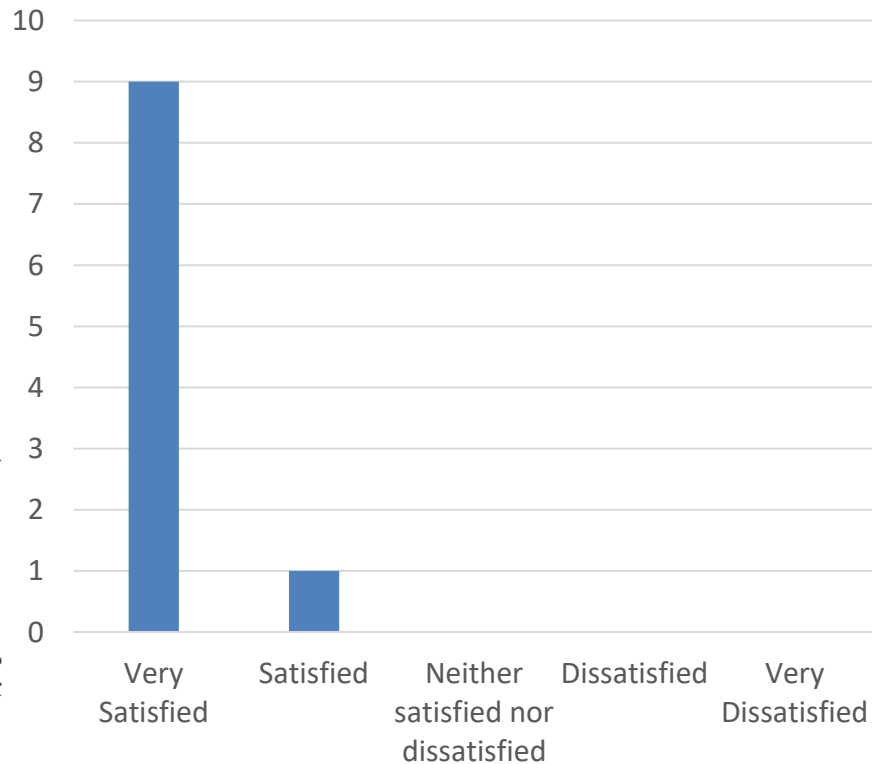


Q6. Did you find the TATU virtual ward helpful?

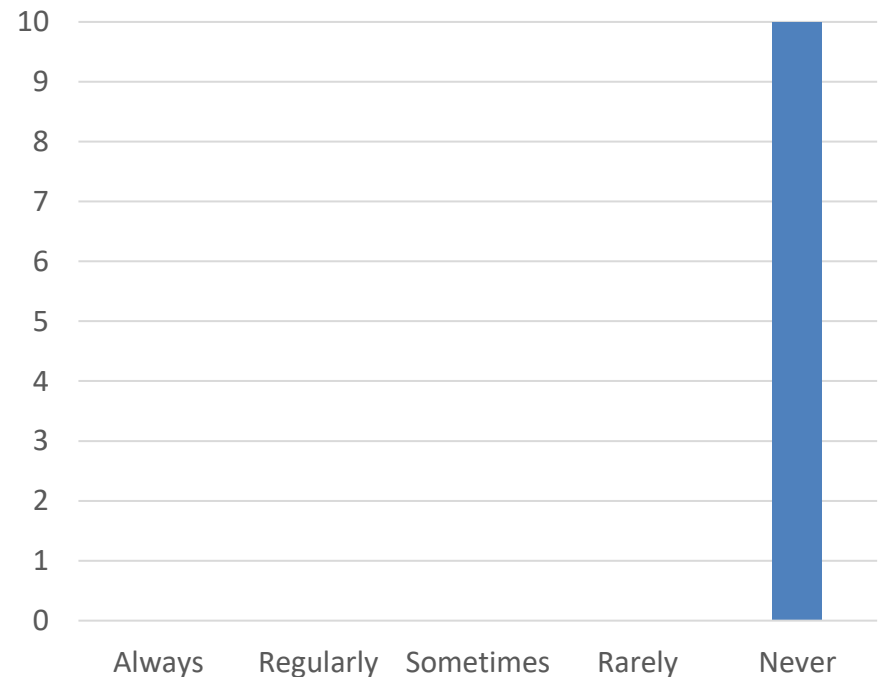


Results PDSA 2 – Patient Feedback

Q7. How satisfied were you with using the pump at home



Q8. Did you experience any difficulties with delivery of pump?



Results PDSA 2 – Patient Feedback

Positive

- “Excellent”
- “More comfortable at home”
- “Less daunting being in a hospital environment”
- “Brilliant service”
- “This is an excellent solution to the home IV therapy team and admission that I have previously had to have for IV antibiotics”
- “It's the way forward to help save beds and the NHS”

Negative

- “ran out of pumps”
- “Communication could have been improved”
- “felt sorry for staff on ward who were very busy”
- “Better patient information”

Results – Costs (based on SHTG 2021 cost model)

48 Hrs Admission for IV fluclox	48 Hrs IV Abx pump via TATU everyday	IV Abx pump via TATU VW/Self-Care over 48Hrs
£773.75	£230.70	£216.40

Estimated savings from PDSA 1 (46 admission days saved-DC only)

Daily inpatient cost	IV Abx pump via TATU	Saving
£17,796.25	£5,306.10	£12,490.15

Estimated savings from PDSA 2 (109 admission days saved – 80 days from VW 29 days from DC)

Daily inpatient cost	IV Abx pump via TATU	Saving
£42,169.38	£12,000.99	£30,168.39

Drug names	unit cost (£)	Treatment dose (based on 70kg bw)	Daily cost (£)	7-day treatment cost (£)
Dalbavancin 500mg vial	558.7	1500mg intravenously as single dose or 1000mg on Day 1 followed by 500mg on Day 8	239.44	1676.1
Linezolid 600mg tablet	0.5	600mg po BD	1	7
Linezolid 100mg/5ml suspension (150ml bottle)	222.50 per bottle/£7.42 per 100mg in 5ml dose		14.83	103.83
Daptomycin 350mg vial	23.51	700mg iv OD	47.02	329.14
Daptomycin 500mg vial	28.95			
Teicoplanin 200mg vial	3.51	600mg iv bd for 4 doses then od	15.7	109.89
Teicoplanin 400mg vial	8.7			
Flucloxacillin 8g via elastomeric pump (via TATU?)		8g over 24 hrs via elastomeric pump	115.35 (DC)	807.45 (DC)
			108.55 (VW)	759.85 (VW)

Is the elastomeric pump – a Godsend?

- An “old drug” in a “new device”
 - Ideal for time-dependent antibiotics
 - Ideal for multi-dosing regimen
 - Safe and easy to use
 - No worries about the unpredictable outcomes or uncertainty of any new drugs in the market
-
- ❖ Limited restriction in daily activity
 - ❖ Extra care required for line care
 - ❖ Both nursing staff and patients require special training for using the pumps
 - ❖ Not all the abx is compatible with elastomeric pump

Conclusions

- A solution to relieve the bed pressure in acute trust
- Great potential cost savings
- Should be used widely in different settings in healthcare
- Can trial in different specialities using other antimicrobials
- Explore the possibilities to extend the shelf-life of the filled pumps