BSAC OPAT CONFERENCE, 11 DECEMBER 2019: QUESTIONS SUBMITTED TO SLIDO	
Question	**Answer**
SESSION 1: CURRENT CHALLENGES AND NEW OPAT FRONTIERS	
What blood tests did you do for linezolid it's? Blood gases?	FBC/CRP/BCP; we don't do blood gases
How frequently are blood tests undertaken whilst on long term linezolid?	on a weekly basis; more often if concerns
You said your experience of linezlid ADR is low - but 3 out of 9 patients got them - 30% so still carries risk?	all abx carry a risk, we're not giving up treating people just because there can be side effects; all linezolid patients are monitored on a weekly basis (clinically, bloods, side effects), have direct access to clinic; ALL have a plan B or even plan C; keeping a close eye on patients is helping with picking up SE in time; also, if fails happens, it depends WHEN it happens - management will be different for someone having SE on week 5 comparing to, let's say, day 2.
How often do you monitor lactate whilst on linezolid	we do not monitor lactate
Was linezolid guided by culture for all patients? Were there other suitable gram positive agents that could be considered if linezolid not suitable?	yes, where culture was available; for the 2 isolates with only Gram stain available - it was assumed they'll be sensitive to linezolid; yes, there were other options, but people don't seem to consider the idea that you can always go back to iv antibiotics assuming patient fails on oral linezolid and there is no other suitable oral option available.
What's the Linezolid resistance rate in Hull?	12 linezolid resistant isolates - 1 MSSA, 3 CoNS, 9 enterococcus; these are all isolates identified over the last 10 years.
30% of patients on linezolid in your case study had side effects. Is it really safe for extended periods of time?	As I said before, good management is being aware of potential issues, monitor patients closely and have a plan B.
Oral management of CNS infection is crying out for a multicentre retrospective review of current practice. Service evaluation, &standardise practice.	Agree! I'm guessing that is a more of a statement rather than a question. I have asked around, no one seems to use oral ntibiotics in brain infections.
Note very useful stability data for various antibiotics in elastomeric devices but has any testing been done to address erratic delivery rates of these devices?	No – the benefit of performing purely in vitro stability testing is that the variables due to administration in the real world are eliminated. This is beyond the scope of the drug stability testing programme; concerns should be addressed to the device manufacturers.
Conor. What method is used to measure antibiotic concentrations in stability studies?	Full details will be in the published papers, and refer to flucloxacillin and meropenem papers for published work. In brief, concentrations are measured using HPLC once a stability indicating HPLC methodology is established.
Is the folfusor the new name for the LV10? Also why is the vyggon accuser not been tested as previously?	Yes, all testing was done in the Baxter FOLfusor LV10 (and also the B. Braun Easypump II). We invite a range of device manufacturers to support our stability studies, but it is up to them to decide whether to become involved. We aim to have a minimum of two devices tested in each stability study.
Conor. Has anyone measured pyridine concentrations or ceftazidime concentration in ceftazidime infusion bags made up in pharmacies or on the wards?	Comparison of ceftazidime degradation in glass bottles and plastic bags under various conditions. Arsène M, Favetta P, Favier B, Bureau J. J Clin Pharm Ther. 2002 Jun;27(3):205-9. Fortum stability in different disposable infusion devices by pyridine assay. Favetta P, Allombert C, Breysse C, Dufresne C, Guitton J, Bureau J. J Pharm Biomed Anal. 2002 Mar 1;27(6):873-9.
Conor. Are 3 replicates enough for YCD? How can tazobactam concentrations appear to increase with storage time from day 2 v day 8? Is it sufficiently robust?	Yes, the YCD specifies three replicates, so our studies are compliant. In reality, it is challenging to perform three replicates at five time points in two different devices at the same time; increasing the number of replicates would be technically difficult and would likely mean that devices would need to be tested in series rather than in parallel, which would increase the time required and cost of the studies. All analytical results include some level of uncertainty, which is unavoidable. The 95% confidence intervals, calculated for individual results at each stability timepoint, demonstrate deviations between triplicate devices and triplicate test samples within the same testing day. Error can arise from the analytical sample preparation process and reference solution preparation (precision of lab equipment, temperature influence, human error, etc.), stability of the analytical solutions, as well as HPLC instrument error. The acceptance limit typically used in industry for batch-release and also stability testing, is 98-102%. For example, in the case of piperacillin/tazobactam the maximum inter-day variability of the HPLC method was estimated at approximately ±2%. Therefore, depending on precision of the analytical method, there always is a range of concentration, in this case, from approximately 98% to 102%, within which detected changes in concentration simply are not significant. Evaluation of trending of the stability data within the tested time period and concentration range is more accurate and useful in determination of shelf-lives than individual results.
How long is fluid at 32 degrees during real life admin? Skin contact of device is short - small size of flow regulator & tubing.	There are a number of competing variables here – the viscosity of the fluid in the device will affect flow rate, in addition to the bore of the tubing, skin surface temperature and the flow regulator. The reservoir of fluid will have its own thermal mass, which will be slow to change while the device is full but more subject to fluctuation as the volume of the fluid decreases with infusion. We believe that the temperature of the fluid in the devices in the UK is likely to be less than 32°C, but have not performed any definitive studies on this yet.
Are antibiotic stability data applicable for generic compounds ?	If you mean interchangeable between different manufacturers of generic compounds, then the answer is yes. All generic compounds contain the same identical pharmaceutical ingredient and can be expected to behave in the same way for stability testing purposes.
Are we being influenced by the funding available from particular manufacturers in the elastomeric devices selected for testing? Should we not test all devices?	The BSAC supports drug stability testing from its charitable reserves, as part of its commitment to the OPAT Initiative and the charitable objectives of the society – to facilitate the acquisition and dissemination of knowledge relating to antimicrobial chemotherapy. Stability studies are expensive to run. Wherever possible, we look to work in partnership in device manufacturers and the pharmaceutical industry to achieve our charitable objectives and spread the cost of running the studies – we cannot fund studies on all antibiotics on our own. Our studies are run with a minimum of two elastomeric devices that are available in the UK. To test every device available with a particular antibiotic would be prohibitively expensive.
Conor. Should it be required that elastomeric device manufacturers supply the data on their devices to understand how they modulate temperature during use?	This is a matter of commercial confidence and patents and is outside the scope of the BSAC Drug Stability testing programme to influence.
Conor. - in your experience is the stability data interchangeable for the different devices?	Our data to date shows similar results between devices when tested under strictly controlled experimental conditions. However, the devices available in the UK do differ both physically and in terms of the materials they are made out of, which could have a bearing on results in the real world. We cannot advocate or advise assuming that the stability data is interchangeable for different devices.
Is drug stability testing linked to any in vivo studies?	Not in our drug stability testing programme and it would be outside our current remit. It is unlikely that the BSAC would have the resources to be able to do in vivo studies as well as the current in vitro studies.
SESSION 2: STEWARDSHIP AND INTERNATIONAL OPAT : INVITED LECTURES	
You said you can facilitate discharge quickly with elastomeric devices. Are they made up in house, if so who by, or bought from an external company? Thanks	The hospital pharmacy is not allowed to prepare and sell any medication for outpatients. Therefore we are working with a private pharmacy, which does prepare elastomeric pumps within a couple of hours. Alternatively the nurses of the OPAT unit prepare the first pump.
Do you monitor tdm in all your opat pts in your Swiss centre	We monitor TDM for all patients with treatment duration of > 6 days
Self-admin: is this limited by type of line? Is line care an issue I.e. has increase in bacteraemia been noted?	Self-administration is only done if a Midline or a PICC-line is in place. The proportion of patients with line complications is not higher in the group of patients doing self-administration
Were any of the adverse events for self admin associated with unstable flow rates?	Not that we know of. Most pumps seem to run slightly faster than the indicated rate and are often empty after 23 hours instead of 24. We believe it would be more problematic if the flow rate was lower than the one indicated.
Do you load you patients with a 1st dose of antibiotic prior to starting a 24hr infusion?	Yes, all patients receive a loading dose 2 hours before connecting an elastomeric pumps
Are there specific pumps that are more or less reliable in terms of flow rates? Is stability data specifc to a specific pump type?	The flow rates are indeed sometimes surprisingly unprecise depending on the brand. Stability data are specific to one brand, but the differences are not major.
Are you concerned about the implications of resistance with using meropenem as OPAT? Stewardship vs OPATability	As long as Meropenem is used when really indicated, I don't expect an increase in resistance. Meronem in the outpatient setting will probably remain a rarely used antibioitc in comparison to the use in hospital.
Question for Serge. How many pumps did you test the flow rate in your study? Have you looked at other pumps? And if so so they behave the same?	At the early stage of our project back in 2014, we tested 3 different types of elastomeric pumps and chose to work with one brand. Since then we didn't reevaluate other pumps
Switzerland OPAT: were any studies done on the degradation of antibiotics in elastomeric pumps whilst in use or assume stability as kept cool, inc not buffered	We measured antibiotic degradation il elastomeric pumps under real-life conditions for Cefazolin, Cefepime and Piperacillin/tazobactam (see J Antimicrob Chemother 2017; 72: 1462–1465)

Serge - do we need a global consensus for drug stability testing - what do you see the barriers are?	Ideally there should indeed be a global consensus on stability testing. At this stage the UK/ BSAC has chosen a very restrictive and conservative approach in comparison to other countries. In Switzerland we believe that the many advantages outweigh the slightly higher risk of using elastomeric pumps more liberally.
SESSION 3: INNOVATIONS AND COLLABORATIONS IN OPAT	
Is the inequity valid in some cases? If the demand is valid for a certain area, is that okay?	It is a matter of terminology but by definition inequity is unjust and therefore not 'valid'. Differences in service use or infection do of course arise between groups and some of this is beyond the gift of OPAT services to overcome, e.g. deprivation influences infection rates due to living conditions, occupations, etc. and genetic factors also influence infection rates. In work like this though we are mostly trying to identify 'modifiable' forms of inequality, which we would call inequity: that is inequality that is unjust and avoidable. In my 'people and bicycles' slide I tried to distinguish between equality of provision: i.e. that the service is available to everyone according to their clinical need, to equity of provision: that the service is adapted to meet differing 'non-clinical' needs. This could include translation services, transport costs being provided, at-home provision, community provision where the service is needed, etc.
Did you consider availability of district nursing services as a factor in reducing equity of provision?	In our setting district nurses don't provide OPAT but I have little doubt that providing OPAT in people's homes would reduce inequity from a patient point of view. There would still be some inequity in who would be referred to the service, and who the service would accept, but I think the impact on reducing travel time and costs and the need for a carer would vastly reduce inequity in our setting.
Can you share the data collection tool used for your equity study	See below for similar question
Are there ease to use tools (Excel spreadsheets) that services can easily use to measure equity of access to OPAT?	We used the analytical approach set out below but it is important to stress that the investigation of inequity does not need to be complex or statistically driven: it can also take the form of a discussion at a team meeting, a quality improvement project or any other effort. The important thing is to raise the awareness of equity as an element of NHS service that is beyond service provision. Our four step approach is outlined below. One: Linked service and admissions data At its most basic you just need two datasets for this analysis: your admissions data and your OPAT service data. You need to be able to match these datasets, i.e. identify the individuals admitted who are 'known' to your service i.e. have had one or more fulfilled appointment. For this there must be some common link between the two datasets – in Scotland we can use a CHI number or CRN to do this. Two: Basis of inequity You then need to think what measures of inequity you are interested in. We focused mostly on deprivation and gender but there are more you could think about. To measure deprivation you can use postcodes to look up local deprivation. We use SIMD in Scotland but you can use IMD in England http://dclgapps.communities.gov.uk/imd/idmap.html or WIMD in Wales https://statswales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation. Gender can be taken from your admissions or your service data. Other sources of inequity you might be interested in thinking about are distance from the clinic or measures of rurality / connectedness such as the Scottish Government Urban Rural Classification (https://www.gov.scot/publications/scottish-government-urban-rural-classification-2016/pages/2/) Three: Confounding / Interacting issues You then need to think about what else might influence the relationships between your equity measures, and your outcome (being known to OPAT). This could include age (as a minimum), distance from clinic, number of co-morbidities or others. Ultimately you are looking for a minimum dataset of all cellulitis admissions with these headings: Unique IDKnown to OPATDeprivation QuintileGenderAgeConfounders... XXXXXYes / No1,2,3,4,5M/F###e.g. # admissions, Four: Analysis You may want to think about analysing different groups separately such as those who are trained to adminster OPAT at home vs. Those who receive OPAT in clinic as outpatients; or older patients vs. younger patients. You are then looking for any differences in the outcome (know to OPAT), by the explanatory variable (equity issues e.g. deprivation). You can draw bar charts, you could calculate referral rate ratios between groups, or add in your confounding variables into a logistic regression. Even the most basic analysis will give you some pointers on potential sources of inequity – you do not need to get into complex statistical analyses.
Equity: an important confounder is medical co-morbidities eg concomitant heart failure. Was this considered separately to smid?	Agreed, individual co-morbidities were not assessed and this is a limitation. We assessed only the total number of co-morbidities recorded. A more detailed study of the co-morbidities that reduced the likelihood of a referral to OPAT would be very useful and allow tailoring of service provision to try and overcome these inequities.
Do you use po abx for culture negative pi- if so - what?	Ciprofloxacin and doxycycline
Was there any increase in c.diff cases post oviva?	No - not so far
How do you monitor your oral patients, we see our oral patients weekly and manage their symptoms effectively or change regime early to avoid re admission.	Blood tests occur at a frequency decided by the microbiologist at the point of initiation. These blood tests are taken locally to the patient (usually by the GP). All patients on oral antibiotics are give an RNOH orals leaflet. This contains direct telephone number for our bone infection nurses. Out of hours we have training in place for our site practitioner to triage calls from bone infection patients.
Are you happy with bone penetration of oral doxycycline monotherapy?	Yes - doxycyline has good bioavailability and bone penetration
Tariq: how many of your oral patients who needed a change in therapy ended up on IV therapy?	1 of the 15 patients started on an oral regimen needed switching to an IV. This was due to GI intolerance on oral antibiotics.
how much did it cost for nurse/pharmacist/clinician time manage the additional ADRs in the post implementation group?	We don't know yet. This is an important piece of work and we will be looking to do this in the near future.
ROH - you didn't use linezolid pre or post OVIVA. Is this correct?	Our usual practice is to treat for 6 to 12 weeks. Generally we don't use linezolid for this duration due to concerns of toxicity. However, we do use it were there have been complications on Ivs e.g. daptomycin or possibly Teicoplanin.
Oral regimens for culture negative?	Ciprofloxacin and doxycycline
How to deliver virtual rounds and virtual wards to deliver good governance and stewardship in Trust OPAT ??	Good teamwork, established team roles and close communication with patients. Our OPAT service is monitored by the antimicrobial stewardship committee. This is all underpinned by the GPR. We will certainly be undertaking the GPR self-assessment presented by Dr Ann Chapman.
Have any trusts using pharmacists more considered using advanced practice pharmacists for more clinic reviews?	As this is evolving pharmacists are still embedding themselves in what are essentially fledgling services, but as described by Peter later in the afternoon, pharmacists are willing to adapt and enhance their role as required to deliver the OPAT service their Trust needs.
Eileen -How did you engage nationally?	I'm not sure we have fully engaged. There is a will amongst infection specialists, pharamcists, and senior managers to move forward with OPAT but there is still lack of engagement from clinical colleagues. A pilot undertaken at the start of the regional group's formation demonstrated benefits to throughput (early discharge/admission avoidance) which helped get senior management and Board support.
SESSION 5: CLINICAL CASE STUDIES	
How do you avoid your pharmacists being treated as a surrogate microbiology registrar	We still carry out all of our antimicrobial pharmacist roles including AMS and clinical pharmacy input. Our OPAT role has expanding in order to meet the needs of the service, however we are still very much pharmacists.
Peter: do you have your own Pharmacist led clinic? And if yes what's the biggest benefit from that?	Not at present.
How easy is it as a pharmacist to decline patients for opat if the patient does not have effective infection source control?	Patients are assessed by pharmacists, nurses and a consultant as part of the process. Acceptance is through the team.
The Lennon tool looks very time intensive. Any way to make it leaner?	It can be as detailed as required. Interesting it is not only used at the point of planning for discharge. It is referred to many times during the patients time with OPAT and is an excellent reference.
What impact does this expanded roe have on your professional indemnity	No role. We work under the guidance of an infectious diseases consultant. Our pharmacists have completed clinical masters and are independent prescribers.
How do pharmacists identify patients to be reviewed by OPAT?	A variety of ways. Ward referral. Via phone calls to microbiology when seeking advice and during AMS ward rounds.
Peter - how many nurses WTE support your service and to what extent do you implement OVIVA regimens?	Two nurses. We consider the OVIVA regimens but review each patient separately.

Peter: great presentation of what our profession can offer. How confident are you as pharmacists on physical assessment of patients and how do you address this?	We have completed physical examination testing as part of our independent prescribing qualification and this is an area of development. However, seeing a patient early in their hospital stay allows comparisons to be made throughout the patients treatment which is helpful. Under the guidance of the infectious disease specialist we are developing our ability to diagnose and assess cellulitis , varicose eczema and diabetic feet.
Peter - how does your opat administration work? Self admin/clinics/community nurses?	All via community nursing at present. We have no self or carer administration at present.
Great presentation. Have you or any of your colleagues thought about going down the ACP (advanced practitioner) route?	We have completed our clinical masters and IP, however aim to further advance of skills in whatever way possible.
How are your Accufuser pumps filled for your endocarditis service? Done by nurses or bought in ready filled?	Currently we have a network of community nurses that administer our OPAT service. We are in discussion at present about rolling out accufusers.
To what extent do you use oral (POET) regimens for endocarditis?	We consider all research when looking at each patient before deciding on a plan suitable for the individual.
What doses of benzylpenicillin and flucloxacillin do you use in infusors? Have you used TDM and adjusted continuous infusion doses?	Currently we have a network of community nurses that administer our OPAT service. We are in discussion at present about rolling out accufusers.
Did you start off trialling elastomeric devices in a small cohort of inpatients prior to rolling out out as OPAT?	Currently we have a network of community nurses that administer our OPAT service. We are in discussion at present about rolling out accufusers.
Why do the OPAT clinical nurse specialists not undertake the reviews	The OPAT nurses are involved with the review process in general but are not completing Lennon tool clinical reviews at present.
Liz - what meropenem levels did you take? and what were the target levels please? Who processed the levels.	We collected blood samples, via biochemistry bottles & our lab sent them onto Bristol Southmead for analysis. We collected the samples 6 hours post dose (half way through the dosing interval) to ensure that the drug level (mg/L) at 6 hours in the bloodstream was 50% above the MIC to ensure bacteriocidal action throughout the whole of the dosing interval (12 hours).
How did you manage meropenem TDM?	We collected blood samples, biochemistry bottles & our lab sent them onto Bristol Southmead for analysis. They measured the level of meropenem in the blood stream & reported the result as mg/L. We collected the samples 6 hours post dose & our pharmacist worked out the therapeutic value of this result
How do you review wounds/lines	For pt's on the self-aministration pathway we arranged either an appointment with the OPAT nurse at a more convenient time i.e. weekend for line care, bloods etc. Or we arranged for the community team to provide line care & blood sampling
Do the district nurses administer the i v anti biotics to the patients in the community? Do OPAT visit patients in their own home?	Our OPAT team is based purely in the hospital setting, but we have trained our local D/N's to give IV Abx. Local pt's have a choice of either attending our infusion centre in the hospital, having a community nurse or learning to self-administer
Does your trust require consent form for other clinics that conduct telephone consultations?	We are the first clinic at our Trust to provide telemedicine consults. For purely telephone consults I don't think consent is required. I guess the concern is with the security/computer viruses possibilities.
Why do you not use an interpreter in Tele medicine clinics?	The interpreter system of choice in our Trust is via a 3-way telephone link which does not work with a Skype call.
How do you pay for it?	Web cam was from the OPAT budget. Skype - IT arranged
Liz how do you communicate with GPs? What method of communication do you use?	All GP's get a FAX whenever an OAPT pt is discharged advising of OPAT. For the Skype pt's of concern, we ring the GP direct & discuss how we can provide a service.
Do you think there's a big advantage of telemedicine over phone consults	Yes! Phone consults are useful but you cannot see the pt.
Who prescribes and dispenses the abx? Meropenem in primary care?	The OPAT team maintain all governance for all our pt's therefore we prescribe & dispense all Abx. If we need to we deliver as well
What do you think the advantages are of Skype to a telephone call?	You can see the pt on a video call, check the line etc
SESSION 6: WHERE ARE WE NOW AND WHERE NEXT?	
Mark: is there an easy way to extract NORs data from the OPAT database? - i.e. a NORs report? If so can you share it with us? If not can we address this?	Unfortunately OPAT PMS is run by Horizon and BSAC do not have access to that database.
How many OPAT services are there? 48 can't be all of them?	We are aware of > 100 centres. The tricky part is not all are entering data for reasons I mentioned at the conference. In 2020 we are changing tack and looking to resource decreet surveys to obtain clinical and service data to drive forward the "Must have" rather than "nice to have" agenda.
Should we stop inputting nors data as from now?	No please continue to complete Q4 of 2019 – we will send more information out shortly.
planning to use the PMS available via Microguide as now easy add on .Sadly no link with NORS which would have helped data input	Agree. Unfortunately OPAT PMS is run by Horizon and BSAC do not have access to that database.