

Improving the evidence for improving cross-sectoral working



UNIVERSITY OF
LINCOLN



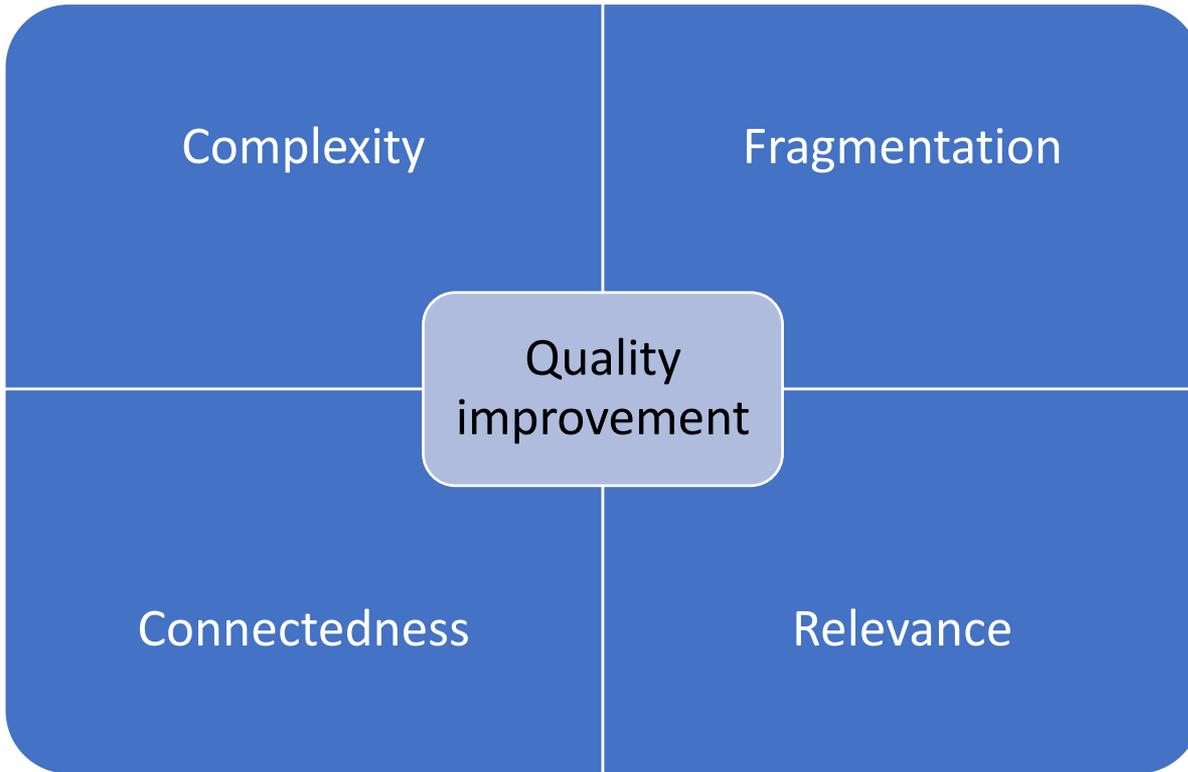
THIS Space 2021

Professor Niro Siriwardena, Professor of
Primary and Prehospital Healthcare,
Community and Health Research Unit
University of Lincoln

*Alone we can do so little; together we can do so
much”*

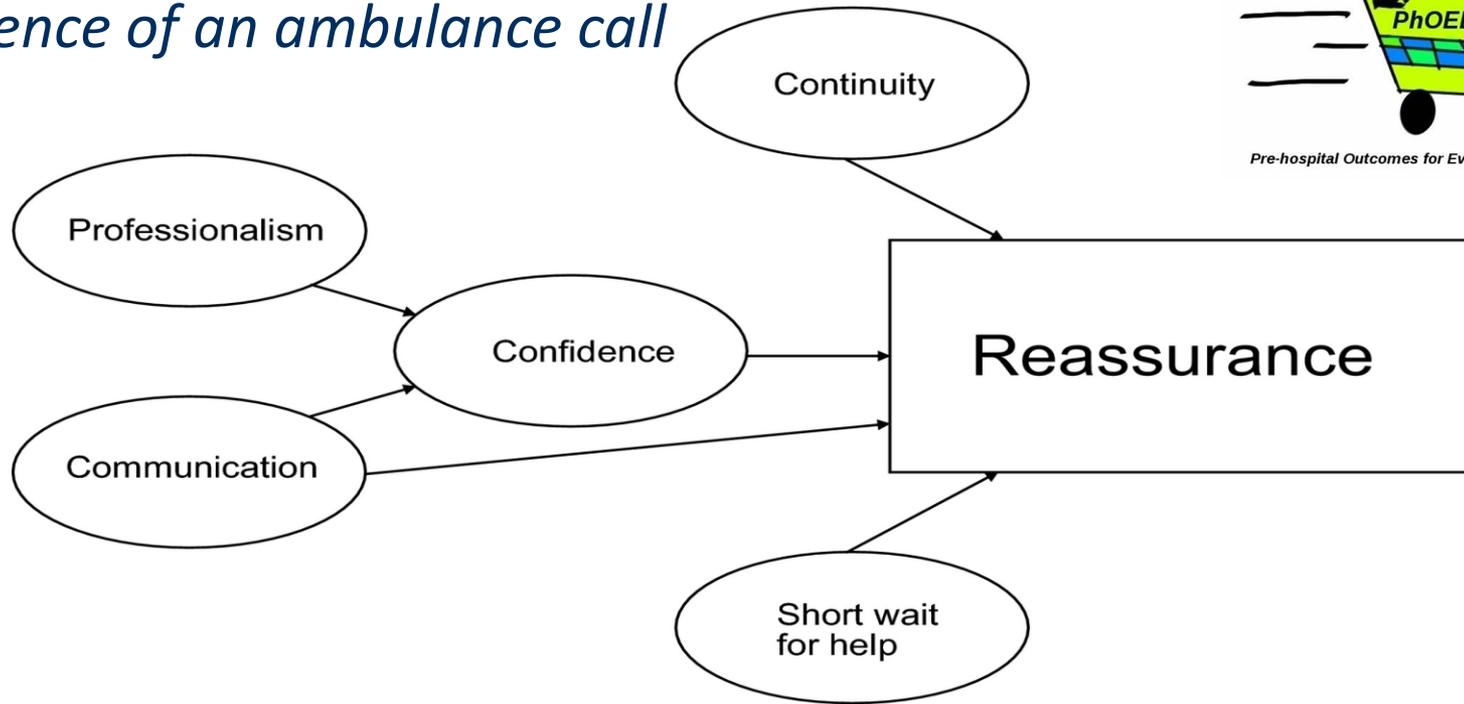
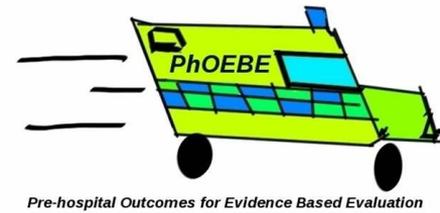
Helen Keller

Cross-sector collaboration is when two or more organizations work together across sectors – industry, non-profit, and government to achieve mutually beneficial outcomes.



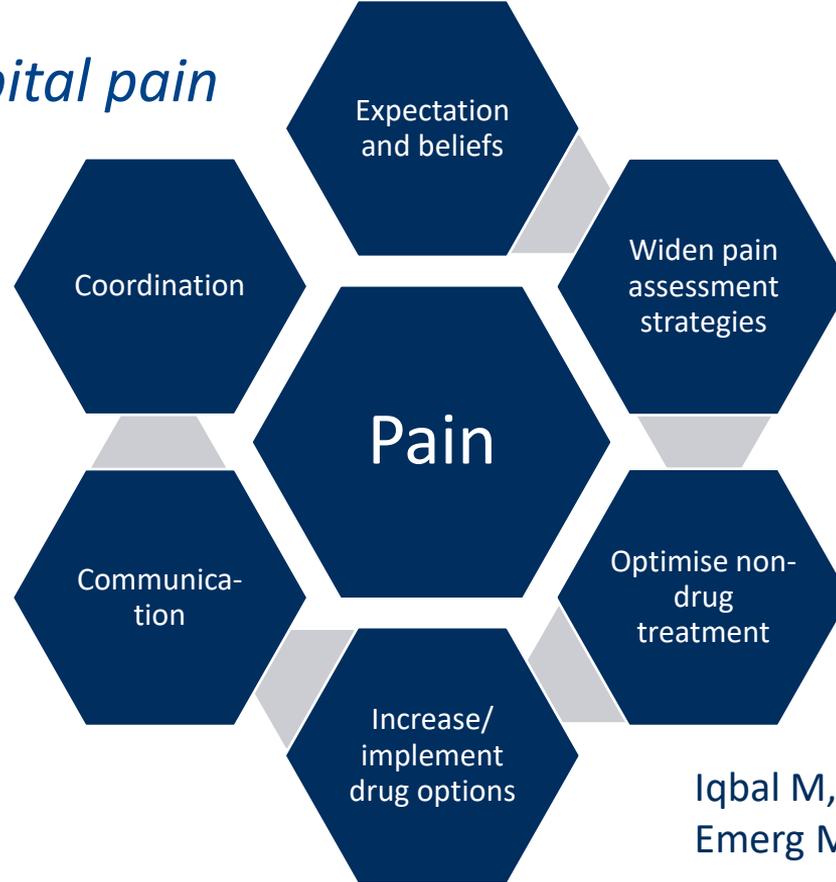
Defining problems and solutions

Experience of an ambulance call



Togher FJ, O’Cathain A, Phung VH, Turner J, Siriwardena AN. Reassurance as a key outcome valued by emergency ambulance service users: qualitative interview study. *Health Expectations* 2015 18 (6), 2951-2961

Improving prehospital pain



Iqbal M, Spaight A, Siriwardena AN.
Emerg Med J 2013;30:e18.

Emergency care for care home residents

- Ensuring resources and staff capacity
- Processes for high quality care
- Building trusting relationships, underpinned by good communication
- Attention to ethical practice

Curtis F, Jayawickrama WIU, Lapidou D, Weligamage D, Kumarawansa WKWS, Ortega M, Siriwardena AN. Perceptions and experiences of residents and relatives of emergencies in care homes: A systematic review and metasynthesis. *Age and Ageing* 2021 (online first).

Developing quality measures

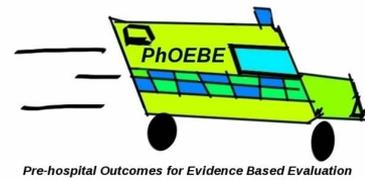
Multistakeholder consensus event

- Aim: to prioritise potential measures for measuring ambulance service quality and performance
- 1 day event, 42 participants
- Ambulance service, patient and public, commissioners, policy makers, academic research
- Round table small group discussions, live voting



Coster J, Irving AD, Turner JK, Phung VH, Siriwardena AN Prioritizing novel and existing ambulance performance measures through expert and lay consensus: a three-stage multimethod consensus study. *Health Expectations* 2018; 21:249–260

Ambulance performance measures



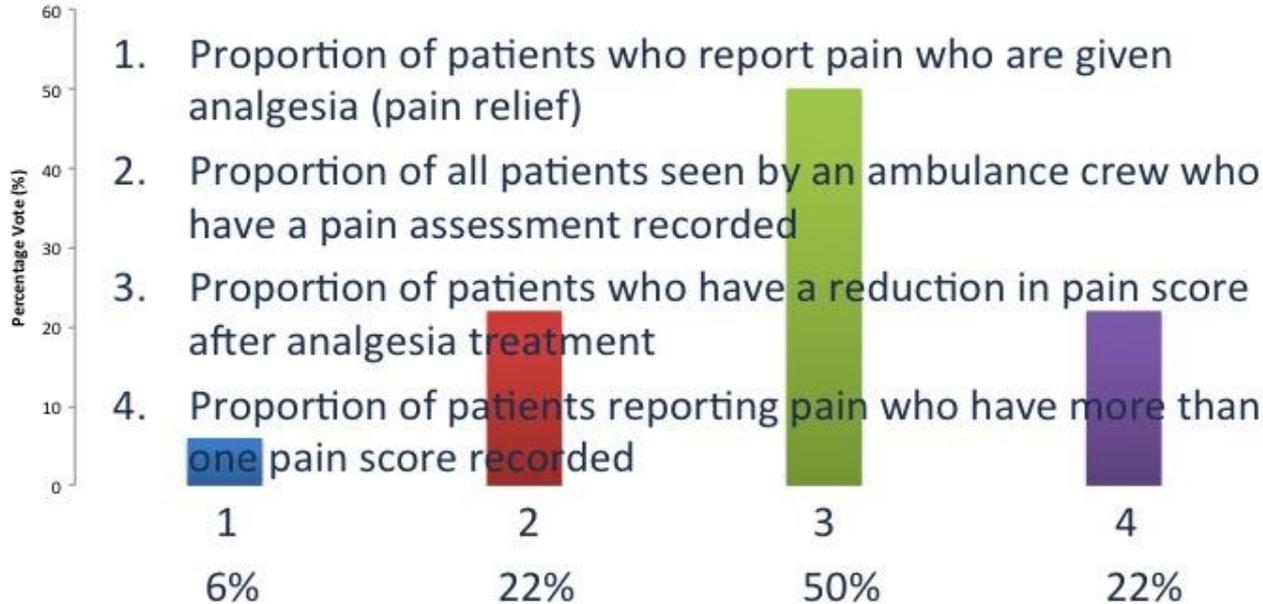
Rank	Service/Operational	Essential (n%)
1	Completeness and accuracy of patient records	35 (83)
2	Over triage and under triage rates	31 (73)
3	Proportion of calls treated by most appropriate service	30 (71)
	Patient management	
1	Accuracy of dispatch decisions	36 (86)
2	Accuracy of call taker identification of different conditions/ needs	34 (81)
3	Compliance with end of life care plans	31 (74)
	Patient outcomes	
1	Pain management and symptom relief	32 (76)
2	Patient experience	21 (50)
3	Return of Spontaneous Circulation (ROSC)	18 (43)

Coster J, Irving AD, Turner JK, Phung VH, Siriwardena AN. Prioritizing novel and existing ambulance performance measures through expert and lay consensus: a three-stage multimethod consensus study. *Health Expect.* 2018; 21:249–260.



The University Of Sheffield.

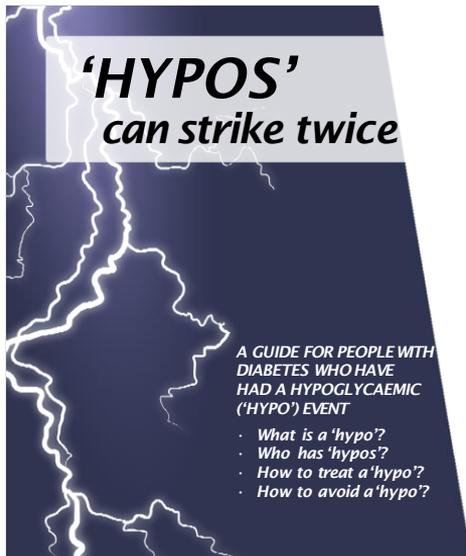
Pain measures



Irving A, Turner J, Marsh M, Broadway-Parkinson A, Fall D, Coster J, Siriwardena AN. A coproduced patient and public event: an approach to developing and prioritizing ambulance performance measures. *Health Expect.* 2018; 21:230–238.

Developing, implementing and evaluating interventions

Ambulance 'Hypos' can strike twice



How to avoid 'hypos'

- Eat regularly
- You may need to eat more carbohydrates before and after physical activity
- Keep to sensible alcohol limits and do not drink on an empty stomach
- Take your medication at the recommended dose and times
- If you are testing your blood glucose levels, and notice your readings are regularly dropping, discuss this with your diabetes team as you may need a change in medication or to have your insulin adjusted
- Always carry glucose and a starchy snack with you to treat 'hypos' quickly



If you need help treating your 'hypo'

If you are not able to treat your 'hypo' yourself, but are still conscious and able to swallow, someone can give you glucose gel if you have this available.

They should slowly squeeze the gel from one sachet into the inside of your cheek and around your gums. They should gently rub the outside of your cheek as this will help absorption into your gums. If done correctly it can take up to 15 minutes to use the whole sachet. You may need to be treated with two sachets. Once you are able to eat and drink, you should eat a starchy snack.

If you become unconscious, you need **immediate** emergency treatment. Someone should dial **999** for an ambulance and you should be put on your side with your head tilted back.

If you are unconscious, glucose treatments should NOT be put in your mouth.



**East Midlands Ambulance Service (EMAS)
responded to a 999 call to treat you for a 'hypo'**

Name:	DOB:	
Address:	Job No:	
	GP Surgery:	
Location: <input type="checkbox"/> Home <input type="checkbox"/> Other (please specify)	Lives Alone: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Date & Time of EMAS arrival:		
Time of EMAS departure:		
How you were	When we arrived	When we left
Time of reading (h/h/mm)		
Breathing rate		
Blood glucose (mmol/l)		
Oxygen saturations		
Heart rate		
Blood pressure (mm/Hg)		
Temp (°C)		
ECC rhythm (12 lead)		
Pain score	/10	/10
Conscious level (please tick)	ALERT <input type="checkbox"/> VERBAL <input type="checkbox"/> PAIN <input type="checkbox"/> UNRESPONSIVE <input type="checkbox"/>	ALERT <input type="checkbox"/>
Treated with: Fast acting carbohydrate <input type="checkbox"/>	GlucoGet* <input type="checkbox"/>	
	IV Glucose <input type="checkbox"/> IM Glucagon* <input type="checkbox"/>	
Conveyed: <input type="checkbox"/> No <input type="checkbox"/> Yes (specify):		
Clinician Referral to:		

You have had a 'hypo' and were treated with fast-acting carbohydrate:

You were conscious and able to swallow but unable to treat yourself so you were treated with fast acting carbohydrates. (EMAS please)

- 60 mls Glucojuice*
- 4 large or 7 small jelly babies
- 150 ml - 200 ml of smooth orange juice
- 5 - 6 GlucoTabs*
- 5 - 6 Dextrose* tablets

Other:

You were conscious but unable to treat yourself, but still able to swallow so you were treated with: (EMAS please)

- 25g GlucoGet*
- You were unconscious and treated with: (EMAS please)
- 1mg Glucagon* intra-muscularly
- 10% Intravenous glucose

You will be referred to your local diabetes specialist nurse team or your GP. You may be contacted and asked about your current medication and advised about how to prevent another episode.

Please telephone your GPsurgery if you do not want to be contacted.

Now you have recovered:

- If you are not due to eat a meal, eat some starchy food like a sandwich or a banana
- You should eat regularly over the next 24 hours, including starchy food e.g. rice, bread or potato
- You may need to reduce your insulin dose or your diabetes medication - you must do this in discussion with your GP, Diabetes Health Professional or, at any other time, through the Out of Hours GP
- If you have a meter, test your blood glucose every 4 hours during waking hours
- Do not drive or operate machinery for at least 12 hours
- Avoid strenuous activity for 24 hours
- Avoid alcohol for 24 hours

Your diabetes medication:

Please tell us your current diabetes medication. This may help us to understand why you have had a 'hypo'.

EMAS PLEASE COMPLETE

Data and main outcome variable

- Interested in the effect of the intervention, more precisely if a second call occurred after receiving the leaflet.
- Outcome variable coded as **successful call** or **unsuccessful call** (i.e. a call followed by another call for a hypoglycaemic episode).

4825 patients

Time period	Unsuccessful calls
Within 2 weeks	212 (4.45%)
Within 3 months	484 (11.18%)
Within 9 months	592 (18.19%)
2 years	884 (18.32%)

Non-randomised stepped wedge design

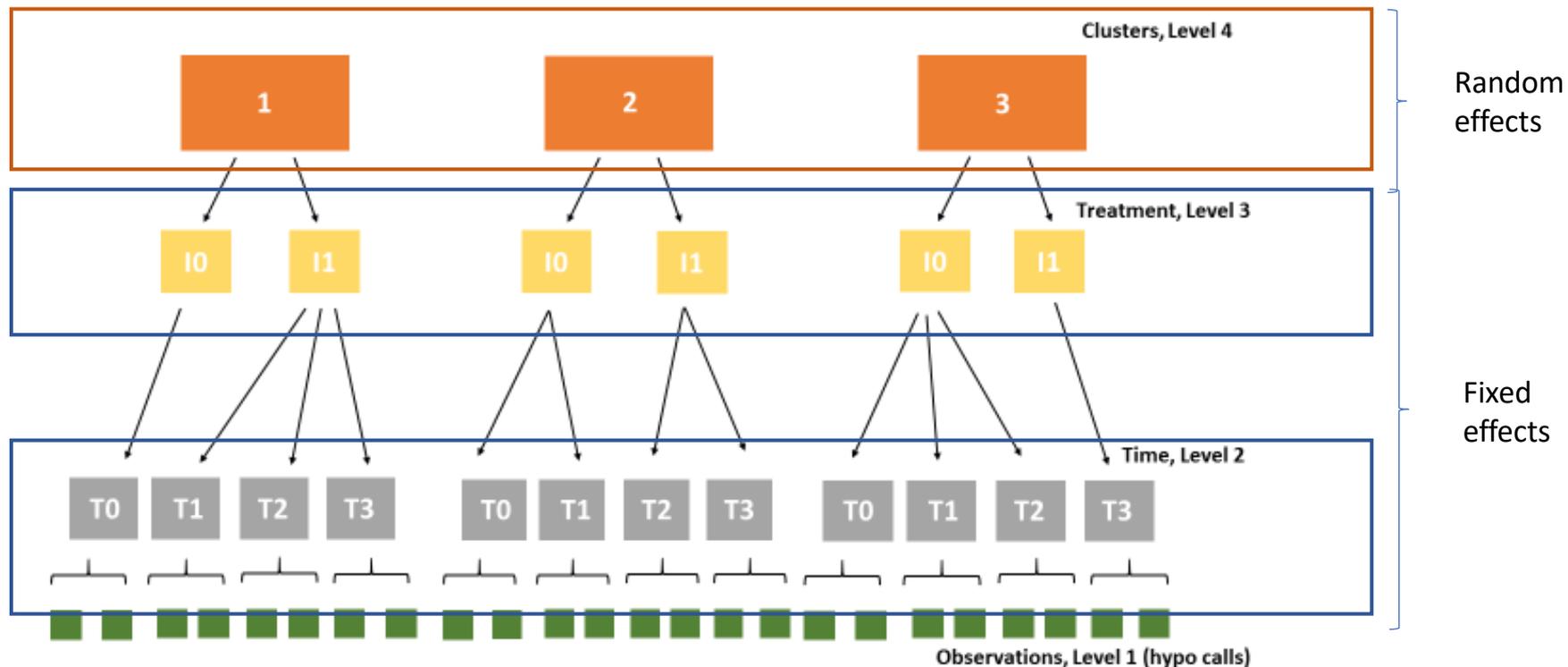
- Initial period when no clusters exposed to intervention.
- Subsequently, at regular time intervals (“steps”) one cluster crosses from control to intervention.
- Each cluster contributes observations under both control and intervention observation periods.

Cluster	Time			
	T0	T1	T2	T3
	03/09/2017 30/11/2018 (13 months)	01/12/2018 28/02/2019 (3 months)	01/03/2019 31/05/2019 (3 months)	01/06/2019 01/11/2019 (5 months)
1 st Cluster L&N				
2 nd Cluster N&D				
3 rd Cluster L				

- Accounted for underlying differences between clusters
- Outcomes were still measured at individual level
- Overcame logistical problems
- Overcame ethical difficulties

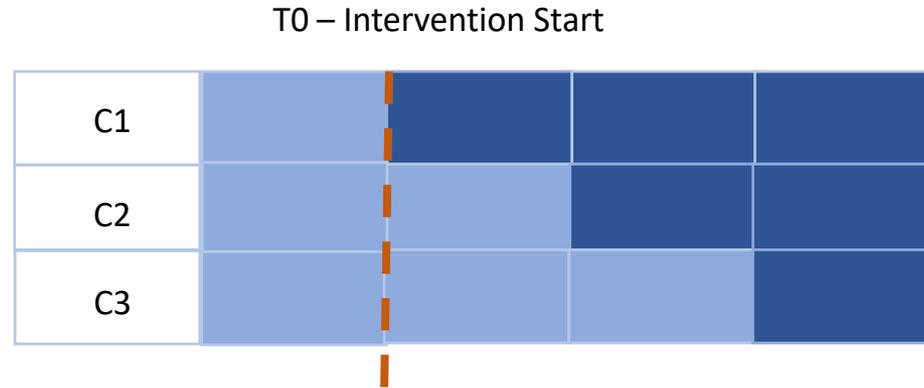
Cluster	Time			
	T0	T1	T2	T3
	03/09/2017 30/11/2018 (13 months)	01/12/2018 28/02/2019 (3 months)	01/03/2019 31/05/2019 (3 months)	01/06/2019 01/11/2019 (5 months)
1 st Cluster L&N				
2 nd Cluster N&D				
3 rd Cluster L				

Generalised Linear Mixed Model (GLMM) analysis



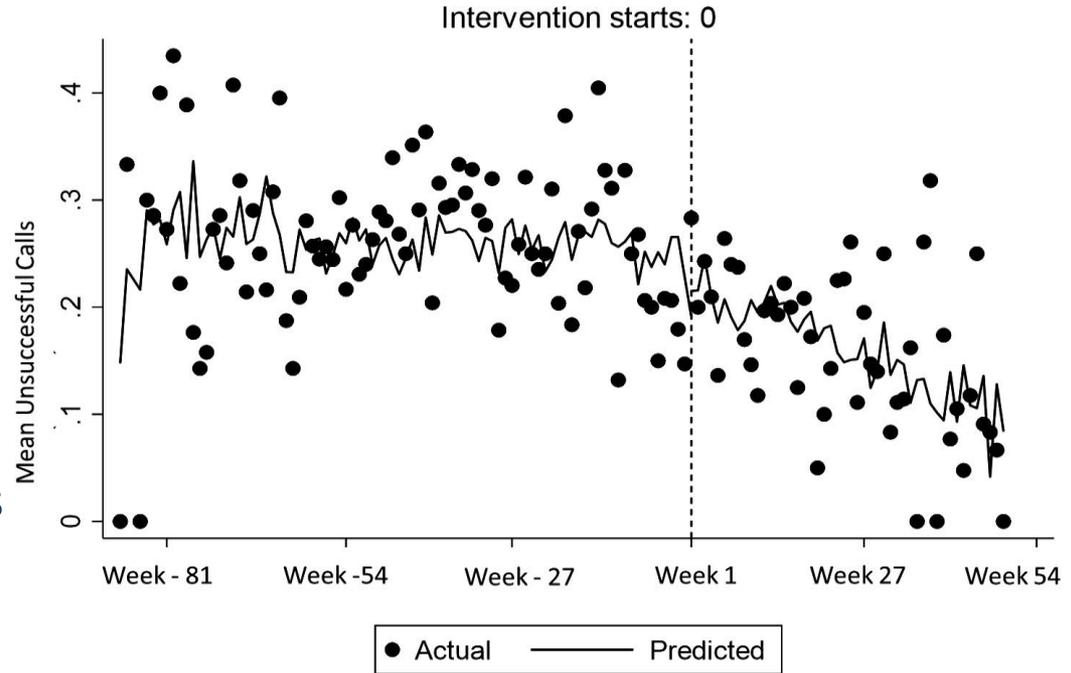
	Odds Ratio	95% Confidence Interval	P value
Intervention	1.04	0.74, 1.48	0.797
T1	1.06	0.82, 1.36	0.671
T2	0.74	0.52, 1.06	0.103
T3	0.50	0.33, 0.76	0.001
Deprivation	0.94	0.91, 0.97	0.001
Month	1.01	0.99, 1.03	0.307
Age	0.97	0.93, 1.01	0.078
Gender	1.19	1.02, 1.38	0.023
ICC		0.006 (95% CI: 0.000, 0.116)	

Interrupted Time Series Analysis (ITSA)



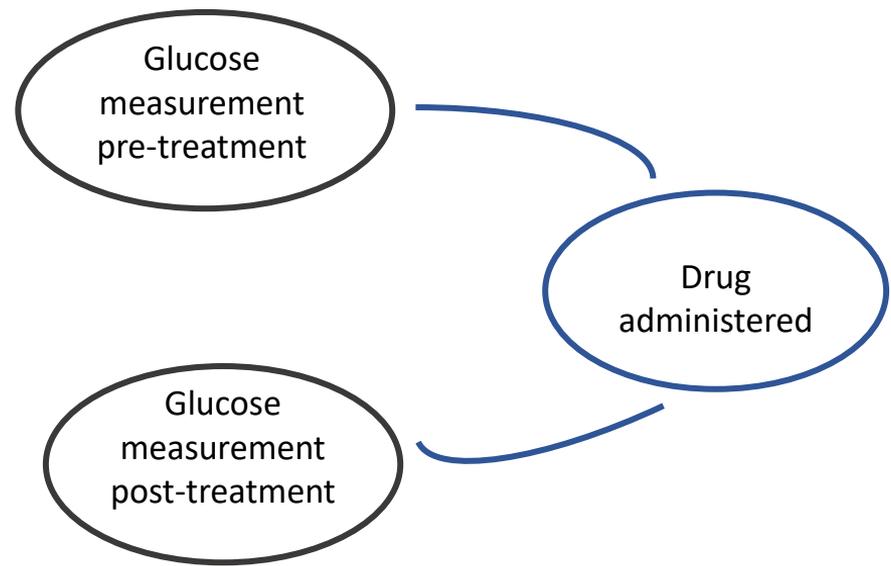
- A different approach to the data. The number of calls coded as a success or unsuccessful **were collapsed** as mean per week.
- All clusters aligned based on the time elapsed before and after the intervention.

- Deprivation, age, gender, and seasonality (i.e. month of the year) were introduced as covariates in the model.
- On the first day of the intervention, the predicted level of the post-intervention trend was lowered by 0.034 (SE:0.025, CI: -0.083, 0.015).
- It was followed by a decrease of 0.003 (SE:0.001, CI: -0.004, -0.0007) of unsuccessful episodes relative to the pre-intervention trend, which was significant ($p=0.008$).



Improved care bundle

- Blood glucose measurements were taken before and after in 95.9% of cases (i.e. for 4628 patients).
- This was accompanied by administration of a drug/agent for treating hypoglycaemia in 66.2% of cases (i.e. for 3193 patients).
- Care bundle achieved more often during intervention period compared to the non-intervention period ($\chi^2=30.16$, $p<0.001$).



Care bundle achieved	
Intervention	No intervention
71.1%	63.3%

- Cross sectoral collaboration led to development of a patient booklet-based intervention for repeat ambulance attendances for hypoglycaemia.
- Cross-sectoral working led to successful use the use of information booklets by ambulance clinicians to prevent future attendances for recurrent hypoglycaemic episodes at a low cost.
- ...and increased completion of the care bundle.



Botan V, Law G, Laparidou D...Siriwardena AN. The effects of a leaflet-based intervention, 'Hypos can strike twice', on recurrent hypoglycaemic attendances by ambulance services: a non-randomised stepped wedge study. *Diabetic Medicine*. 2021;38:e14612.

Conclusions

Cross-sectoral working is essential:

- For *all* improvement because of the need to involve patient and service user contributors and experts
- ...and particularly where improvement efforts cross or might affect intra- or inter organisational boundaries, processes or outcomes
- To account for complexity and address fragmentation
- To ensure connectedness and relevance, ownership and credibility of the problem and its solutions

Acknowledgements



UNIVERSITY OF
LINCOLN

CaHRU
Community and Health Research Unit



UNIVERSITY OF
LEICESTER



Pre-hospital Outcc



East Midlands Ambulance Service
NHS Trust



NATIONAL AMBULANCE RESEARCH STEERING GROUP



NIHR | Applied Research Collaboration
East Midlands

FUNDED BY

NIHR | National Institute
for Health Research

This presentation includes independent research funded by the National Institute for Health Research (NIHR) The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.



Thank you for listening!

Niro Siriwardena nsiriwardena@lincoln.ac.uk

Web: <https://www.cahru.org.uk/>