

Availability of Essential Equipment for Prehospital Trauma Care on Public Ambulances in Ukraine

Stanislav Gaievskiy, BS, EMT-B¹, Oleksandr Linchevskyy, MD, PhD², Colin A. Meghoo, MD, MSc³

¹ Master's Candidate, School of Public Health, Kyiv-Mohyla Academy, Kyiv, Ukraine

² Clinical Hospital #17, Kyiv, Ukraine; Deputy Minister of Health, Ukraine

³ Research Department, Patriot Defence, Kyiv, Ukraine

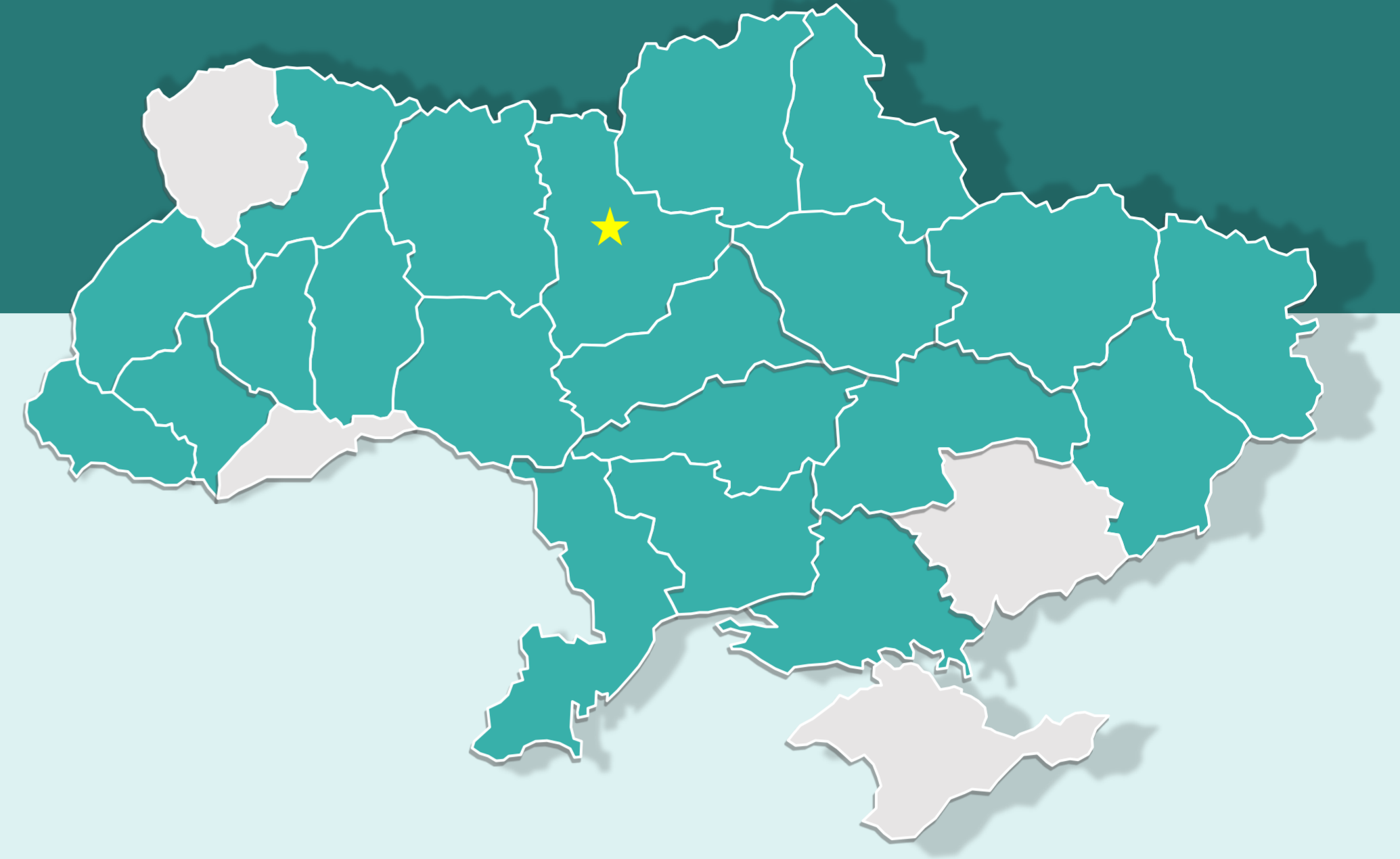


Figure 3 Distribution of assessed regions

1. INTRODUCTION

In Ukraine, trauma from road traffic accidents is a significant source of prehospital morbidity and mortality, with a risk of attributable death that is three times higher than in Germany.¹ Shortfalls in training, equipment, funding, and organizational framework can limit the quality and availability of care provided by responding ambulances. We sought to evaluate the availability of equipment onboard individual ambulances, without relying on unsubstantiated, self-reported data.

Hypothesis - Advanced Life Support (ALS) ambulances across the country might have limitations in essential equipment necessary to provide optimal prehospital trauma care

2. METHODS

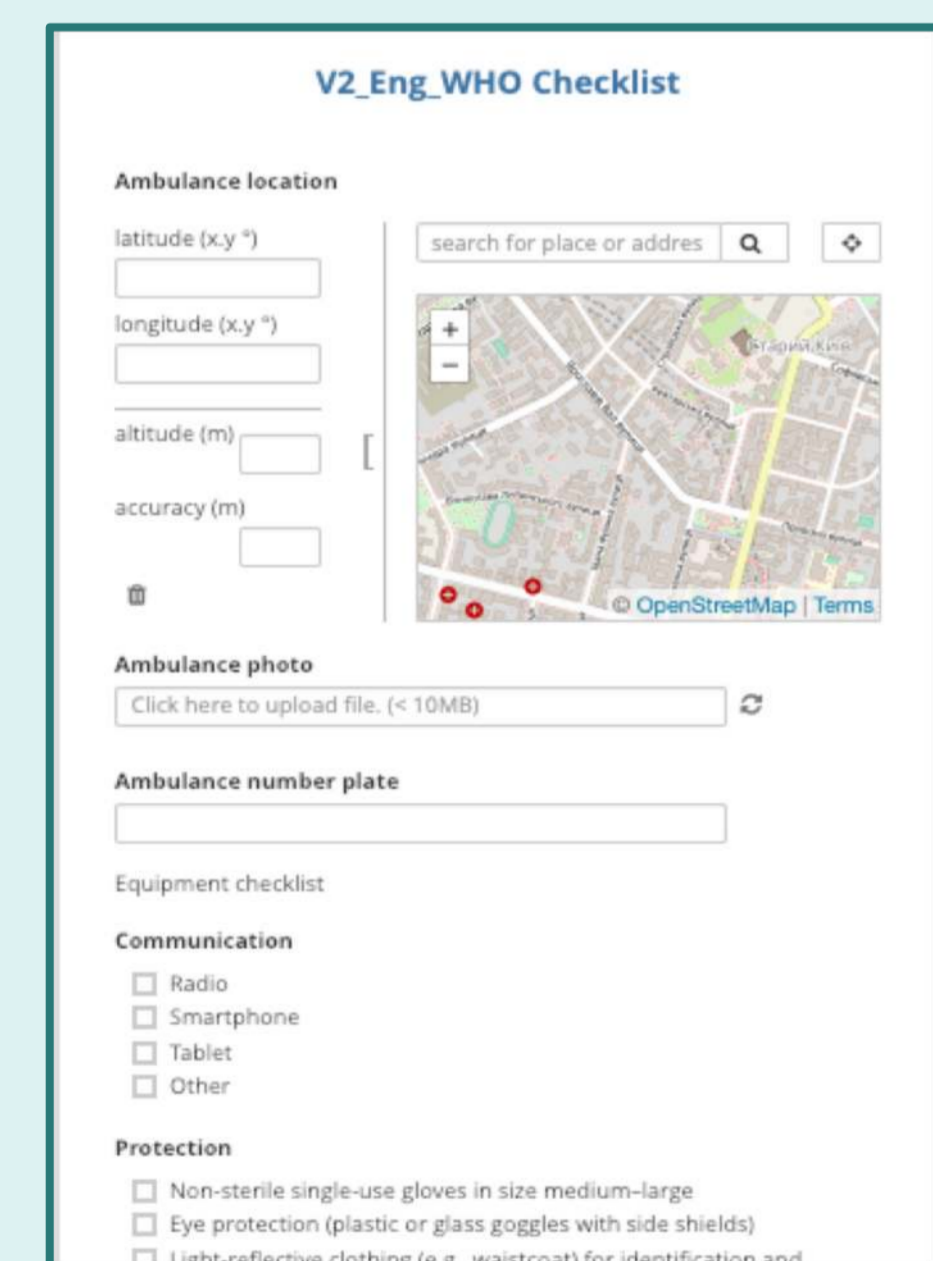
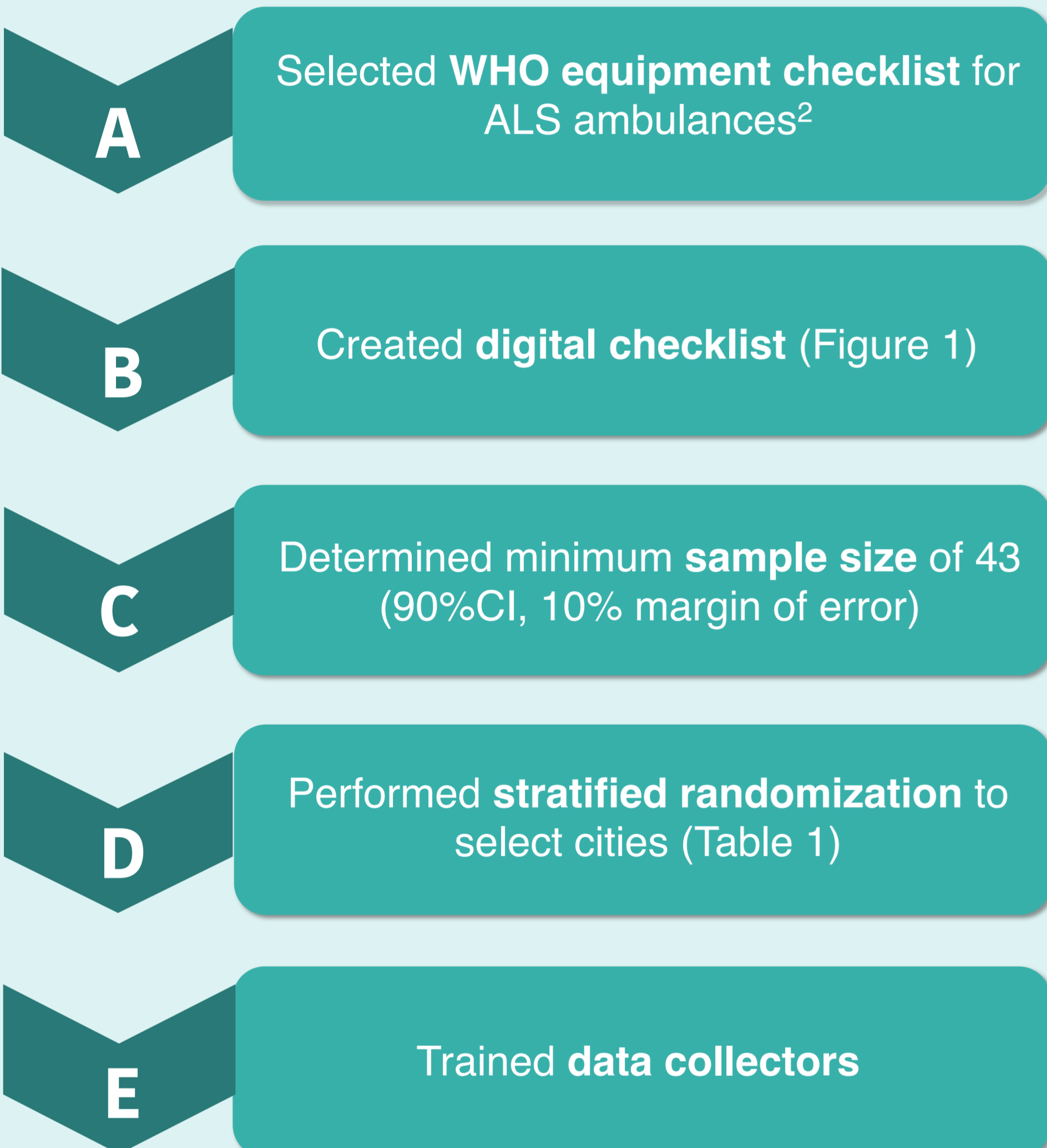


Figure 1 Excerpt, digitized data collection tool

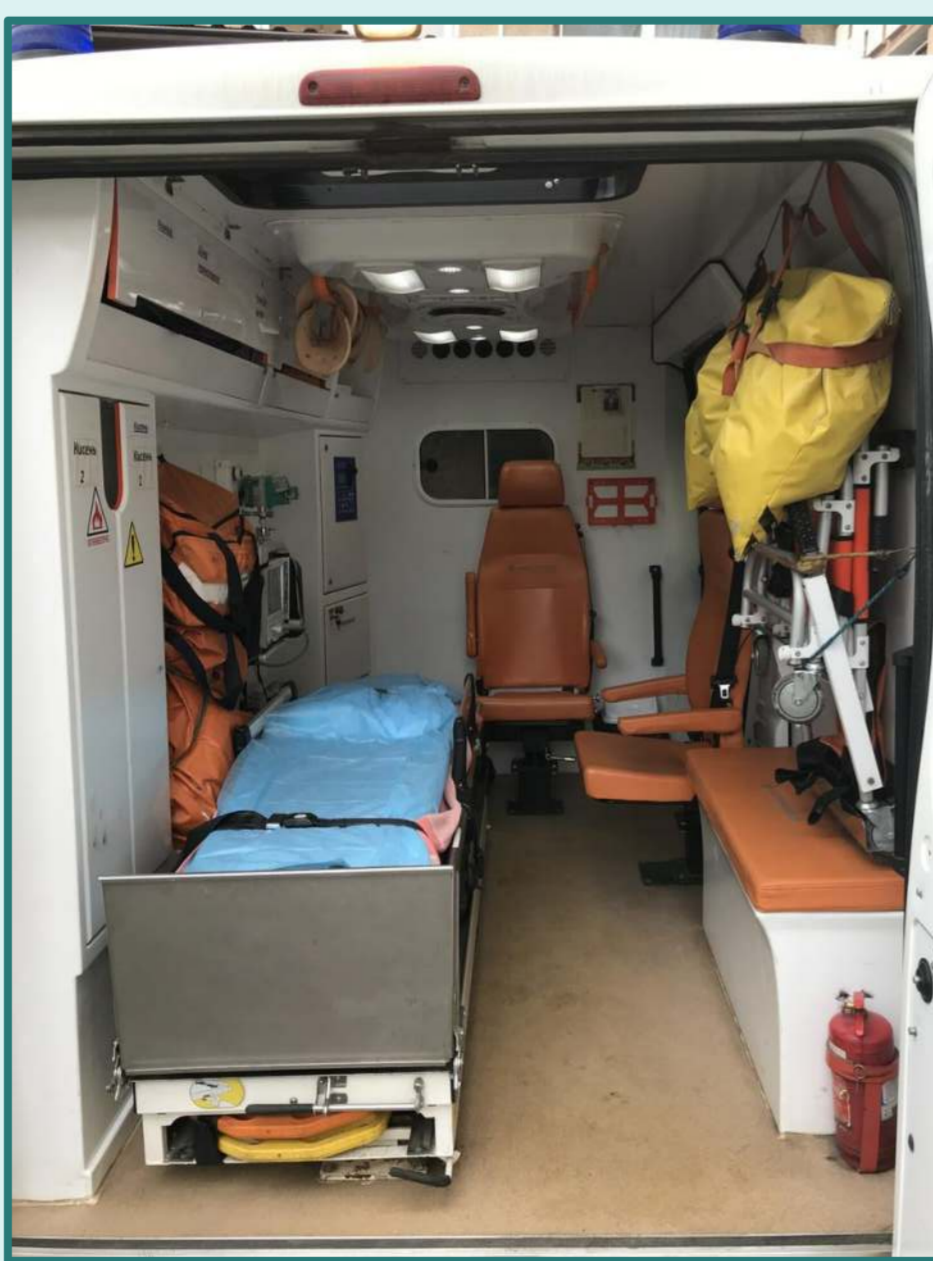


Figure 2 Typical Ukrainian ALS ambulance (inside view)

Population size	# of cities	Total population	% of population	# of sites
> 1,000,000	4	7,300,000	26%	8
100,000 - 1,000,000	42	11,500,000	42%	13
10,000 - 100,000	315	8,700,000	32%	9

Table 1 Stratified randomization of cities, by population

3. RESULTS

- 3 month period
- 6 observers
- 30 ambulance substations in 24 cities
- 48 ambulances evaluated

Item	No.	Present	95% CI
Diagnosis/Monitoring			
● stethoscope	47	97.9	93.9-100
● blood pressure cuff	47	97.9	93.9-100
● thermometer	46	95.8	90.2-100
● pulse oximeter	39	81.3	70.4-92.3
● electrocardiogram (EKG)	44	91.7	84.0-99.5
Hemorrhage control			
● bandages/gauze	47	97.9	93.9-100
● adhesive tape	46	95.8	90.2-100
● arterial tourniquet	45	93.8	87.0-100
Airway/Breathing			
● nasal cannulae	35	72.9	60.4-85.3
● non-rebreather mask	35	72.9	60.4-85.3
● Bag-valve-mask (BVM)	45	93.8	87.0-100
● oxygen cylinder	33	68.8	55.8-81.8
● suction	39	81.3	70.4-92.3
● laryngoscope and blades	22	45.8	31.8-59.8
● endotracheal tubes (ETT)	24	50	36.0-64.0
● end-tidal CO ₂ detector	9	18.8	7.8-29.8
● supraglottic airway (SGA)	34	70.8	58.0-83.6
Vascular access			
● intravenous starter set	47	97.9	93.9-100
● intraosseous device	18	37.5	23.9-51.1
● crystalloid solutions	47	97.9	93.9-100
Immobilization/Patient transfer			
● long spineboard	45	93.8	87.0-100
● stretcher	47	97.9	93.9-100
● c-collar	46	95.8	90.2-100
● splints	48	100	-
Personal protective equipment (PPE)			
● eye protection/face shield	42	87.5	78.2-96.8
● gloves	48	100	-
● fire extinguisher	48	100	-
● sharps container	45	93.8	87.0-100
● traffic control equipment	3	6.3	0-13.1
Miscellaneous			
● communication device	48	100	-
● blanket	37	77.1	65.3-88.9
● triage kit	31	64.6	51.2-78.0
● basic extrication	11	22.9	11.1-34.7
● specialized extrication	0	0	-

● >90% ● 70 - 90% ● <70%

Table 2 Chart of availability of essential trauma equipment



Figure 4 Typical Ukrainian ALS ambulance (outside view)

Figure 5 Ambulance observation in Poltava

4. DISCUSSION

SUSTAIN

Ambulances well stocked with:

- basic tools of assessing patient vital signs
- basic hemorrhage control devices
- basic vascular access and infusion
- equipment to stabilize a suspected spinal injury
- means of communication
- personal protective equipment (PPE)

NEEDS IMPROVEMENT

Ambulances had equipment deficiencies with:

- basic and advanced airway management
- mass casualty triage
- patient extrication (no unified emergency response)

5. CONCLUSION

ALS ambulances in Ukraine have many essential items to handle trauma, including hemorrhage control, vascular access, and diagnosis and monitoring, but have significant deficits for airway management.

The creation of a nationwide, standardized list of required medical equipment for these ALS ambulances may improve the capacity for providing lifesaving prehospital trauma care.

6. REFERENCES

- 1 Kornus A, Kornus O, Shyschuk V. Regional issues on road accidents and traffic injury in Ukraine. Human Geographies - Journal of Studies and Research in Human Geography. 2017;11: 197-212.
- 2 Sasser S, Varghese M, Kellermann A, Lormand JD. Prehospital trauma care systems. Geneva, World Health Organization, 2005



Stanislav Gaievskiy
NGO Patriot Defence
Email: stas.gaievskiy@gmail.com
Website: patriotdefence.org



MINISTRY
OF HEALTH
OF UKRAINE