An Electronic Asthma Performance Indicator (e-API) Reporting System: Use of Standardized Medical Record Data at the Point of Care

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#### **Faculty/Presenter Disclosure**

- **Presenters:** Ann Taite and Jessica Schooley
- Relationships with commercial interests / commercial support:
   Nothing to Disclose
- Potential for conflict(s) of interest: none
- Relationships with commercial interests:
   Nothing to Disclose
- Mitigating Potential Bias: Not applicable

# **Learning Objectives**

- 1. To learn how we implemented an asthma performance evaluation system that can seamlessly access asthma eTools and produce asthma indicator reports in a provincially certified vendor.
- 2. To gain an understanding of how quality asthma data can be captured at the point of care, is extractable and can populate an asthma indicator report used for benchmarking and quality improvement.
- 3. To discover the challenges of integrating a clinical assessment tool for asthma into a primary care EMR.

#### **The Problem**

We identified the need to collect guidelines-based asthma performance outcome data (including quality of life) at the point of care to enable generation of reports supporting best practice and program evaluation.

### **A Solution: Leveraging EMRs**

- Despite guidelines .... care gaps remain!
- Performance measurement, benchmarking and continuous quality improvement are national health system priorities
   practical systems which support chronic disease
  - management are <u>not</u> routinely available.
- Electronic medical records (EMRs) are increasingly prevalent
  - novel opportunity to integrate guidelines into practice

### **Provincial Asthma Care Map**



#### **Primary Care Asthma Performance Indicators**

nt Information Unique Identifier	Quality of Life History	Research Studies	1
0-MSI-4129-6286-706ec0d6775 ttient Identifier 789 cial Health Insurance rr	Save Cancel	Care Asthma Performance Indicat	tors Form
39 Birth 963 [50yrs]	Patient visit date: Person who filled out th	is form: - Please Select - Form filled out for:	123456789
Code	Asthma Indicators	5 5	V2
e	1. PFT	a) Patients' asthma diagnosis was confirmed by PFTs (spirometry, peak flow or methacholine challenge test)	©Yes ©No
		b) Patient was monitored with spirometry in last 12 months	©Yes ©No
se Practitioner-Asthma Clinic		a) Patient is using inhaled corticosteroids (ICS)	Oyes ONo
Bdit Patient		b) Self-reported number of ICS prescriptions filled in last 12 months	
Notification(s)	2. Medication Use	c) Self-reported number of short-acting $\beta 2\text{-agonist}$ doses (2 puffs) per week in last $4$ weeks	
Care Astrima Performance		d) Self-reported number of $\beta 2\text{-agonist-free days in last 4 weeks}$	
Co to PC API module >>		e) Patient has demonstrated their inhaler technique regularly	⊖Yes ⊖No
do to reservino dale 22	3. Asthma Control	a) Asthma symptom control was assessed in last 6 months	⊖Yes ⊖No
		b) Patient's asthma has been well-controlled in last 4 weeks	⊖Yes ⊖No
		c) Self-reported number of symptom-free days in last 4 weeks	
		<li>d) Self-reported number of days missed from school or work due to asthma in last 12 months</li>	
	4. Exacerbations	Patient has had more than one asthma exacerbation in last 12 months	©Yes ©No
	5. Health Care Use	a) Number of ED visits for asthma in last 12 months	
		b) Number of urgent care visits for asthma in last 12 months	
		c) Number of primary care visits for asthma In last 12 months	
		d) Patient has a routine health care provider	©Yes ⊙No
	6. Action Plan	Patient has received a written asthma action plan	⊖Yes ⊖No
	7. Asthma Education	Patient has been referred to see a certified asthma educator	©yes ⊜No
		Patient has received advice to stop smoking	©Yes ⊙No
	<ul> <li>a. amoking Cessation</li> </ul>	or patient is a non-smoker	Oves
	9. Quality of Life	Patient's assessment of their quality of life OExcellent OVery good	Good OFair OPoor
	For questions related to to Susan McLimont Research Project Manage Email: susan.mclimont@	I his form or this study, please contact: Dr. Teresa To ar Principal Investigator & Senior Scientist iskikids.ca Email: teresa (DSiekkids.ca	
	-		

To et al. Int J Qual Health Care. 2010 Dec;22(6):476-85

#### Asthma Management and Outcomes Monitoring System

				Cissec Support   Sign Out
	Patient Summary - Patien	t, Test [VISIT ID: 53be52a5-e5a8-4534-994a-f58eea5bd500]		
> Edit Demographics	General Assessment History Act	ion Plan History Quality of Life History Related Studies Work Related	I Asthma TELUS health space	
> New Assessment	- Rationt Domographics		Objective Measures	
New Action Plan				
> Report an Issue	G			
> Back to Patient List				
		Provincially-cert	fied vendor	
Assessment Indicator Guide				
Ontrolled [Green Zone]	H H			
Partially Controlled				
Uncontrolled [Red Zone]		\		
Assessment [<=48 hours]		VVIGEIV U	Sed	
Assessment [>48 hours]				No
Hate Entry Assessment				5 doses/wk
$\square$				4 days/wk
				1 days/wk
	C.		uroo	- 1 /wk
		· · · · · · · · · · · · · · · · · · ·		- 1 [Dec 01, 2016]
				9 1 [Dec 01, 2016]
	> Cold air	> Colds/chest infections	Work Related Astimute	
	> Emotions/stress	> Exercise	Please Consider Completing A Work Related Asthma Survey.	
	Allergic Triggers		Allergy History	
	> Dust	> Dust mites	> [No Allergy History]	
	> Mould	> Pets		
	Identified Barriers	- Cultural issue		
	<ul> <li>Authenence</li> <li>Lack of drug plan</li> </ul>	> Cultural Issue		

Taite *et al.* Presented at ERS Congress 2017, Milan, Italy *Eur Respir J* 2015 46: PA2787

#### **Step 1: Developed an OSCAR eTool**

**Asthma Assessment Form for Primary Care** 

Asthma Care	Map for Prim	nary Care	Patient's Name	
			Date of Birth	
Date			Medical record #	
Asthma Diagnosis			Ethnicity	
Objectively confirmed as	sthma → indicate r	nethod below:	Eamily History of As	thma / Allergies
Date confirmed			Indicate	parents, siblings, close relatives with:
Pulmonary Function Measurement PREFERRED: Spirometry Reduced FEV/FVC AND Increase in FEV, after a bronzholdator or after course of Controler theney ALTERNATIVE: Peak Expi	Children (6 years of age and over) showing reversible air Less thanlower limit of normal <sup>™</sup> (<0.8-0.9) <sup>™</sup> AND ≥ 12% ratory Flow (PEF) varia	Aduits way obstruction Less than lower limit of normal' (<0.750.6)** AND 212% (and a minimum 2200m)) ability 00.1 low	N Astrma     Eczema     Ervironmental all     Food allergies     Smoking History     Never smoked	Age started Age quit
after course of control therapy OR Dismal variation*	OR Not Recommended	(minimum ≥20%) OR	Ask Advise	Arrange
Diumal variation '	Challenge Test	>8% based upon twice daily readings; >20% based upon multiple daily readings	Pack years Packs/day	ears smoked
a) Methacholin Challenge	PC <sub>20</sub> < 4	img/mL	x	=
OR	>16 mg/mL i	is negative)	Fagerström Test	for Nicotine Dependence
b) Exercise Challenge	O	R	Score	
* Based on age, sex, height and ethnicity.	≥10-15% decrease in	FEV, post-exercise	http://knowledgex.cam	nh.net/Pages/default.aspx
** Approximate lower limits of normal ratios for o This inform	children and adults. nation was originally published in	Can Respir J 2012;19(2):127-164.	Second hand sn	noke Prenatal smoke
Asthma diagnosis for ch Confirmed asthma based on diagnosis: andio immediate response professional; andior immediate respon andior gradual but clear r This interna	ildren (below 6 years typical symptoms, lack to bronchodilator confir se to brochodilator by pi response to anti-inflamm ton was originally published in Cl	of age) of an alternative med by health care arental history; hatory therapy. MAJ. 2010 Mar 9;182(4);E172-83.	Respiratory Medicat	ion History
Suspected (suggestive sym and/or clinical re	ptoms but not yet confir esponse to therapy)	med by spirometry		
History of Exacerbations				
T         N           Prednisone use ever         ED visits ever           Hospitalized ever         Noer fatal episode           Near fatal episode         (Coma / Intubated / ICU / 1CO)	,,		Number of (prescription = a	ICS prescriptions filled in the last 12 months one month supply)
Work Related Asthma		N/A		
Ver Worked?     Z 13 years of age     Confirmed asthma     If YES to all 3, recommend in     Guestionnaire (WRASQ(L)#)     Complete WRASQ(L)# In     Complete WRASQL(J)# In	dividual complete a Work ow ter	-related Asthma Screening	Y N Is patient f Beta-block NSAIDS // Medic Aler Epinephrin Has drug p	using inhaled Corticosteroids? err ⇒ may exacerbate asthma ASA (ron-steroidal anti-inflammatory) ⇒ potential trigger t bracelet te auto injector blan

Asthma Care Map fo	or Primary Care	Patient's Name Medical Record #			
Uncontrolled if:	Today's Visit	Last Visit	Initial Visit		
Daytime symptoms ≥ 4 days/week (short of breath, cough, wheeze, tight chest) on average in the last 4 weeks	Yes No Notes Y N # of Days per week	Yes No Notes           Y         N         # of Days per week	Yes No Notes Y N # of Daysper week		
Night-time symptoms ≥ 1/week on average in the last 4 weeks	Y N # of Nights per week	Y N # of Nights per week	Y N # of Nights per week		
Physical activity limited due to asthma on average in the last 4 weeks	YN	Y N	Y N		
Exacerbations within the last 12 months	ED visit UNIX Walk-in Clinic / Urgent Care Hospitalized	ED visit ED visit Walk-in Clinic / Urgent Gare Hospitalized	ED visit Ungent Care Hospitalized		
School / work / social absence due to asthma within the last 12 months	Y N # of Days	Y N # of Days	Y N # of Days		
Needs reliever ≥ 4 doses/week (incl. pre-exercise) on average in the last 4 weeks	Y N # of Doses per week	Y N	# of Doses per week		
FEV1 or PEF (< 90% personal best)	Y N Notes	Y N Notes	Y N Notes		
PEF diurnal variation (> 15%) over a 2 week period	Y N Notes	Y N Notes	Y N Notes		
Beta₂-agonist free day(s) in the last 4 weeks	# of Days	# of Days	# of Days		
Patient was monitored with spirometry in the last 12 months	Y N	Y N	Y N		
Height / Weight / BMI (plot results on growth charts for children)	Ht cm Wt kg BMI	Ht cm Wt kg BMI	Ht cm Wt kg BMI		
Pref post bronchodilator spirometry or peak flow results         FEV,           Children (6 years and over) and Adults         FVC           Lower Limit of Normal = LLN)         FEV,/FVC	Pre Post LLN Actual %Pres LLN	Pro Post LUN Aduati % Pred. Aduati % Pred.	Pro Post LLN Antual % Prot Antual % Prot		
Complete an Asthma Quality of Life Questionnare today? (AQLQ)	Y N (recommended)	Y N (recommended)	Y N (recommended)		
Action plan provided	Written Revised Reviewed	Written Revised Reviewed	Written Revised Reviewed		
plan followed since last visit	Y N # of times	Y N # of times	Y N # of times		
Medications Green zone					
Yellow zone					
Patient's technique on inhaler device	Reviewed Corrected Optimal	Reviewed Corrected Optimal	Reviewed Corrected Optimal		
Definition/nature of asthma reviewed with patient	YN	YN	YN		
Triggers & environmental controls reviewed	YN	Y N	YN		
Referral to Asthma/Respiratory educator	Y N	Y N	YN		
Other education (e.g. smoking cessation)					
Influenza vaccine	Y N	YN	Y N		
Pneumococcal vaccine	Y N	YN	Y N		

## Step 2: New OSCAR Seamless Link to AsthmaLife<sup>®</sup> Portal/Repository



- Standardized data collected at point of care in AMOMS at KHSC or OSCAR EMR at Queen's Family Health Team
- e-API data populates secure AsthmaLife<sup>®</sup> repository (pushed every 24 hours)
- Single sign-on also allows access to AsthmaLife<sup>®</sup> eTools (WRASQ[L]<sup>©</sup> and eAQLQs)

### Seamless links also allow access to AsthmaLife<sup>®</sup> Portal eTools

#### Electronic Asthma Quality of Life Questionnaires: • eAdult MiniAQLQ

Page 3 of 19	Page 4 of 19
	In general, how much of the time during the last 2 weeks did you:
Thank you for taking the time to fill out the Mini Asthma Quality of Life Questionnaire.	1. Feel SHORT OF BREATH as a result of your asthma?
	All of the time 1  Most of the time 2  A god bit of the time 3  Some of the time 4  A little of the time 5  Hardly any of the time 7  EACEVENT EACEVE
Pege 19 of 19	Justice Round Mit Mile   State Over
	Patient Summary - duck, donald
	New Assessment     As Sale     Symptoms     Activity Limitation     Emotional Function     Environmental Stimul     Edit     Remove
Thank you for completing the	7 New Action Plan 560-17-2005 3.00 4.75 3.33 4.33 3 3 4.3 3 3 4.3 3 4.3 3 4.3 5 4.3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Mini Asthma Quality of Life	2 Report an Issue 3ut-19-2008 5.00 4.25 5.33 4.67 3
Questionnaire.	> Back to Patient List ARCDEFGHIJKLMNOPQRSTUVWXYZAI
R	New mini-AQLQ 图 Download
The Min Atoms double of Unit Questionnaire has been successfully comprised. If you with 5 mine charges is any of your amounts, you may do buy clicking on the provided BACK button. Otherwise, please let your health provider know that you have completed the mini asthma quality of life questionnaire.	(
	Andre Greeken
B Copyright 2008 Queen's University. All rights reserved.	Copyright 2008 Queen's University. All rights reserved.

Olajos-Clow et al. Respir Med 2010; 104(5): 658-67

#### Electronic Work-related Asthma Screening Questionnaire (long version) • WRASQ(L)©

ueens	estionnaire – Lo (WRASQ(L)	ong Versi )™)	ion					
dd Imm haasi	Patient Identif	ier:			Work-related Asthma Scr	eening Questio	mnaire – Lor	ng Version (
Current occupation:	Start	Date: _/_/_		12.	Are you currently or have you in the past I (Check Current, Past or Never for EACH expo.	sure.)	o any of the	following at
Past occupation(s):	From	dd/mm/y			Agricultural agents <i>(e.g. grain)</i> Animal/fish materials Biologic agents <i>(e.g. enzymes, molds, viruses)</i>	Current Current	Past Past Past	Neve
	From: From:		To: _/_/ To: _/_/		Chemicals Cleaning agents	Current	Past Past	New
Current employment status* (Che	ck all that apply):	dd/mm/yyyy	dd/mm/yyyy		Dust Dyes	Current Current	Past Past	New
Full-time Part-time Shift work Modified duties (Mode: This includes self-employment	Off work  Retired  Other	due to respira	tory health		Exercise Food agents ( <i>e.g. flour</i> ) Furnes ( <i>e.g. exhaust</i> ) Insects/Insect materials Socyanates*	Current Current Current Current Current	Past Past Past Past Past	New
Did your asthma symptoms start a	it work?	🗌 Yes	No No		Natural rubber products Perfumes/scents Pharmaceuticals	Current Current Current	Past Past Past	New New New
old your asthma symptoms start w if a spill or fire at work?	vithin days	🗌 Yes	🗆 No		Plants/Plant materials Metal working fluids Metals	Current Current Current	Past Past Past	Nev Nev Nev
Do/did your asthma symptoms wo vork?	rsen at	🗌 Past	Never		Smoke Textile fibers Wood dust	Current Current Current	Past Past Past	New New New
o/did your asthma symptoms wo our first day back to work?	rsen on	🗌 Past	Never		Other (Specify):	ante) are chemic	als encountere	ed in jobs th
Do/did your asthma symptoms wo during the work day?	rsen	🗌 Past	Never	13.	involve spray painting, and manufacturing of plastic, rubber and f. In your opinion, did one or more of these exposures cause and/or trioner your estimation emotions?		⊇ Yes	□ No
0o/did your asthma symptoms wo iome after work?	rsen at	🗌 Past	Never		If yes, which exposure(s)? (Specify):			
Do/did your asthma symptoms wo hroughout the work week?	rsen	🗌 Past	Never	14.	Are you currently using or have you in the (Check Current, Past or Never for EACH prote	past used per active measure,	sonal protect	tion at wor
ire/were chest symptoms (cough/ hest tightness/shortness of breat less) on days off work and/or holi	'wheeze/ h) different idavs? □ Current	Past	Never		Respirator (e.g. mechanical or chemical filter or cartridge, powered air-purifying respirator, self-contained breathing apparatus)	Current	🗌 Past	🗌 Nev
Work related Asthma Sc by the Work related Asthma Prevention and is licensed under a Creditive Common Ad	(cc) BY-MC-MC retening Questionnaire – Long Version 1 d Early Detection Research Program Te bribution-NonCommercial-NoDerivative	(WRASQ(L) <sup>IN</sup> ) am (PI: Dr. Diane Lou 4.0 International Lio	gheed)		Mask (e.g. paper surgical mask) Ventilation (e.g. fresh air, room air exchanges) Other (Specify):	Current Current	Past Past	Nev Nev

*Killorn et al. J Asthma* 2014; 9:1-10; Killorn *et al. J Asthma* 2014;10: 1-9.

# **Step 3: Designed a Reporting System**

 Programmed Dr. Teresa To's Primary Care Asthma Performance Indicator (PC-API<sup>©</sup>) Form

		Patient Sum	mary - 123456789
atient Information	Quality of Life History	Research Studies	
Iobal Unique Identifier			
da9d7d0-ff5f-4129-b2bb-70fbac0d677b	(Save ) (Cancel		Print
ite Patient Identifier			
23456789	Primary	Care Asthma Performance Indicat	tors Form
rovincial Health Insurance		eare / tothina / errorinanee malea	
23466700		_	
23406789	Patient visit date:	Patient Health Card Number:	123456789
ate of Birth	Person who filled out thi	s form: - Please Select - Form filled out for:	- Please Select -
ender			
male	Participation of the second second		
ostal Code	Asthma Indicators		ve
		a) Patients' asthma diagnosis was confirmed by PFTs (spirometry, peak flow or	0
rovince	1. PFT	methacholine challenge test)	Tes ONO
ntario	110,4000	b) Patient was monitored with spirometry in last 12 months	Ves ONo
ite	-		0100 010
3H- Nurse Practitioner-Asthma Clinic		a) Patient is using inhaled corticosteroids (ICS)	OYes ONo
Edit Patient			
-		<ul> <li>b) serr-reported number of ICS prescriptions filled in last 12 months</li> </ul>	
tudy Notification(s)	2 Medication Lise	c) Self-reported number of short-acting β2-agonist doses (2 puffs) per week in	
	2. medication ose	last 4 weeks	
ndicators		d) Self-reported number of 82-agonist-free days in last 4 weeks	
No Questionnaires completed.			
		e) Patient has demonstrated their inhaler technique regularly	OYes ONo
Go to PC-API module >>			0
	3. Asthma Control	a) Asthma symptom control was assessed in last 6 months	Yes No
		b) Patient's asthma has been well-controlled in last 4 weeks	Oyes ONo
			0.11 0.11
		c) Self-reported number of symptom-free days in last 4 weeks	
		d) Self-reported number of days missed from school or work due to asthma in	
		last 12 months	
	4 Exacoshations	Patient has had more than one asthma exceedation in last 12 menths	0. 0.
	4. Exacerbations	Patent has had more than one assuma exacercation in last 12 months	O Yes ONO
		a) Number of ED visits for asthma in last 12 months	
		b) Number of urgent care visits for asthma in last 12 months	
	5. Health Care Use	at Manches of estimate state state for estimate to had 45 exception	
		of rearranding on primary care visits for astrima in last 12 months	
		d) Patient has a routine health care provider	OYes ONo
	6. Action Plan	Patient has received a written asthma action plan	OYes ONo
	7 Asthma Education	Patient has been referred to see a certified asthma educator	Over Over
		- week now over referred to see a certilied ascende educator	UTES UNO
		Patient has received advice to stop smoking	OYes ONo
	8. Smoking Cessation		0
		or patient is a non-smoker	() Yes
	2 12 12 12 12 12 12 12 12 12 12 12 12 12	Patient's assessment of their quality of life	Good Geair Open
	9. Quality of Life	Creatient Overy good O	Good Graf OPoor
	For questions related to the	is form or this study, please contact:	
	Susan McLimont	Dr. Teresa To	
	Research Project Manage	r Principal Investigator & Senior Scientist	
	Email: susan.mclimont@s	eckids.ca Email: teresa.to@sickkids.ca	
	(Save) (Control	2	
	Save Cancer		
		Primary Care Asthma Performance Indicators (PC-API) Form, authored by Dr. Targers To	
		© The Hospital for Sirk Children, 2009, revised 2011 Version 2 date: 2011.10.29	

- The system auto-populates Primary Care Asthma Performance Indicators (e-API<sup>©</sup>)
  - ✓ From AMOMS
  - ✓ From the OSCAR Asthma Assessment Form

Identities and a state of the second state of the second state of the						
Asthma Indicators	(N=10.0)	(N=1				
1. PFT						
<ul> <li>a) Percentage of patients whose asthma diagnosis was confirmed by PFTs (spirometry, peak flow or methacholine challenge test)</li> </ul>	70.0%	60.				
b) Percentage of patients monitored with spirometry in last 12 months	60.0%	46.				
2. Medication Use						
a) Percentage of patients using inhaled corticosteroids (ICS)	80.0%	66.				
<li>b) Average number of ICS prescriptions filled in last 12 months*</li>	4.4	5.				
c) Average number of short-acting 82-agonist doses (2 puffs) per week in last 4 weeks*	3.0	2.				
<li>d) Average number of  <sup>®</sup>2-agonist-free days in last 4 weeks*</li>	1.0	5.				
e) Percentage of patients that have demonstrated their inhaler technique regularly	70.0%	60.				
3. Asthma Control						
a) Percentage of patients whose asthma symptom control was assessed in last 6 months	90.0%	73.				
b) Percentage of patients whose asthma has been well-controlled in last 4 weeks	50.0%	60.				
<li>c) Average of symptom-free days in last 4 weeks*</li>	3.5	3.				
d) Total number of days missed from school or work due to asthma in last 12 months*	15.0	16				
4. Exacerbations	1					
Percentage of patients that had more than one asthma exacerbation in last 12 months	50.0%	40.				
5. Health Care Use	İ	ĺ				
a) Total number of ED visits for asthma in last 12 months	7.0	8.				
b) Total number of urgent care visits for asthma in last 12 months	6.0	7.				
c) Total number of primary care visits for asthma in last 12 months	0.0	0.				
d) Percentage of patients that have a routine health care provider	100.0%	100				
6. Action Plan						
Percentage of patients that have received a written asthma action plan	80.0%	66.				
7. Asthma Education	1	1				
Percentage of patients that were referred to see a certified asthma educator	10.0%	13.				
8. Smoking Cessation	i	i				
Percentage of patients who smoke	20.0%	40.				
Percentage of patients who have received advice to stop smoking	50.0%	33.				
9. Quality of Life		i				
Average quality of life assessment*						
or Mini AOLO/PAOLO score	31	3				

Adapted with permission (May 2015) from the Primary Care Asthma Performance Indicators (PC-API ©) Form authored by Dr. Teresa To, The Hospital for Sick Children, 2000, revised 2011 Version 2 date: 2011-10-28. Report Generated By Asthmalife com

# e-API<sup>©</sup> Reporting System



- Extracts data elements from 2 different asthma e-records and generates e-API<sup>©</sup> reports
- Is an asthma performance evaluation system, integrated into the process of care in the Southeastern Ontario Asthma Care Network
- Documents performance

#### **Challenges and Barriers**

- Multiple Firewalls
- OSCAR updates affecting programming
- Initial permissions (provider disclaimer)
- Frequent onboarding of new staff/residents
- Perceived need/utility
- Integration into the process of care

#### **Conclusion and Next Steps**

- Despite the ever changing EMR landscape and numerous technological hurdles, it is feasible to collect guidelines-based outcome data at the point of care to enable report generation supporting best practice and program evaluation.
- We hope our findings have helped to inform this audience about the process and challenges in collecting quality primary care data from multiple EMRs that is extractable and reportable to enable continuous quality improvement.
- Future work could see our developed IT architecture and workflow design, demonstrating integration and interoperability, used by other OSCAR sites and EMRs in the province.

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