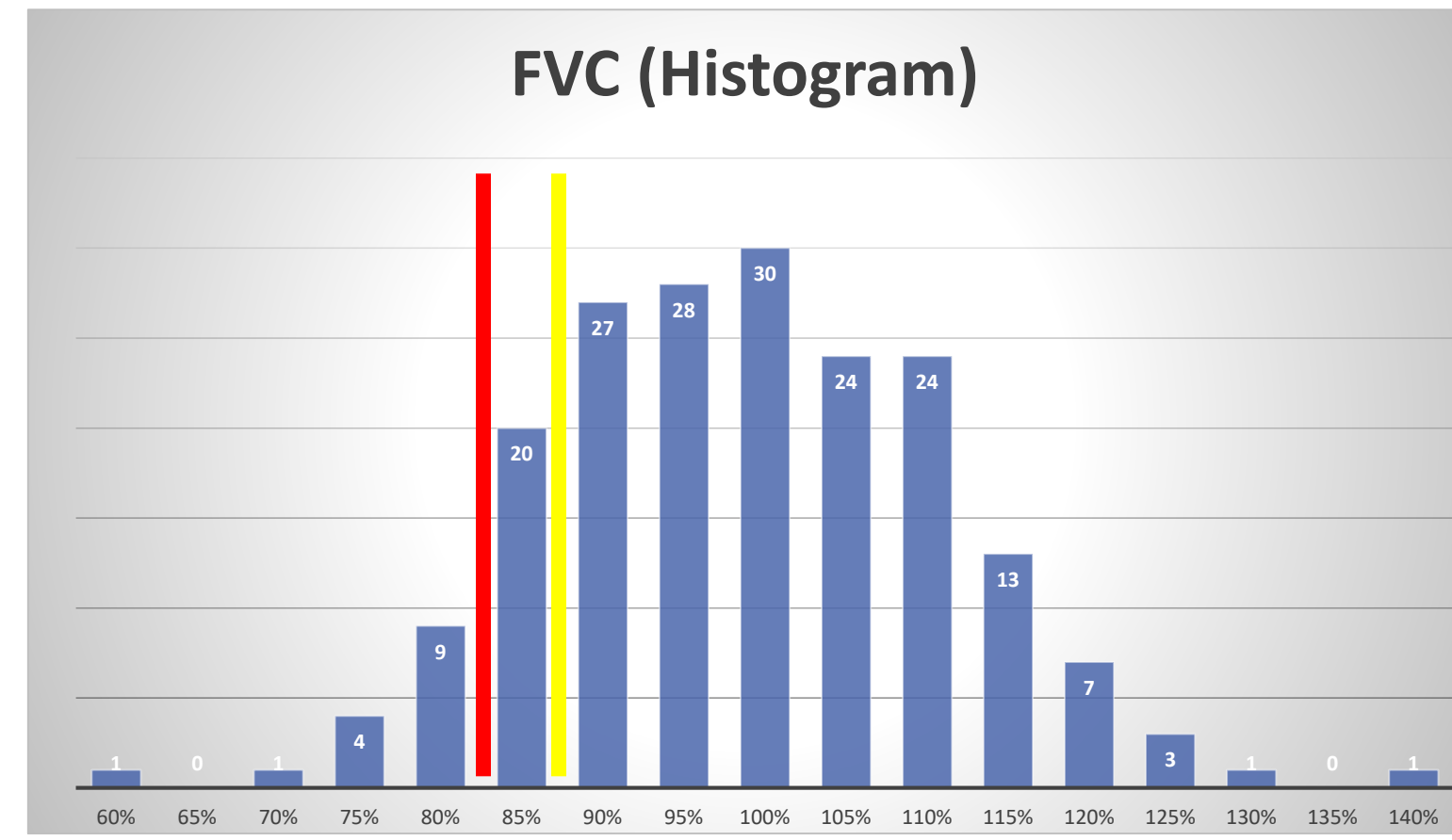


Part II : DMADV

LT Jerry Bradley (Black Belt), CDR Jamie Vega (DPH, Champion)
Naval Health Clinic Lemoore

Design – Restrictive Process



Evidence Based Criteria

- The diagnosis of a *pure restrictive process* is based on a **FVC < 80%** of the predicted age and height adjusted values from the NHANES III data base (Johnson & Theurer, 2014).
- The American Thoracic Society (ATS) recommends that a restrictive process can be diagnosed if it is less than 5% of the lower limit of normal (LLN) for the patient. The LLN varies depending on age and height with values for the current population of this study at **82-83%**.
- Additional studies have analyzed FVC between 85% and 70% with risk for prediction of a restrictive process increasing as the FEV approaches 70% on formal pulmonary function testing (De Matteis, Iridoy-Zulet, Aaron, Swann, & Cullinan, 2016).
- Use of FVC alone as the primary predictor of restrictive process gives the highest probability of correlation on formal testing (Venkateshiah, Ioachimescu, McCarthy, & Stoller, 2008).

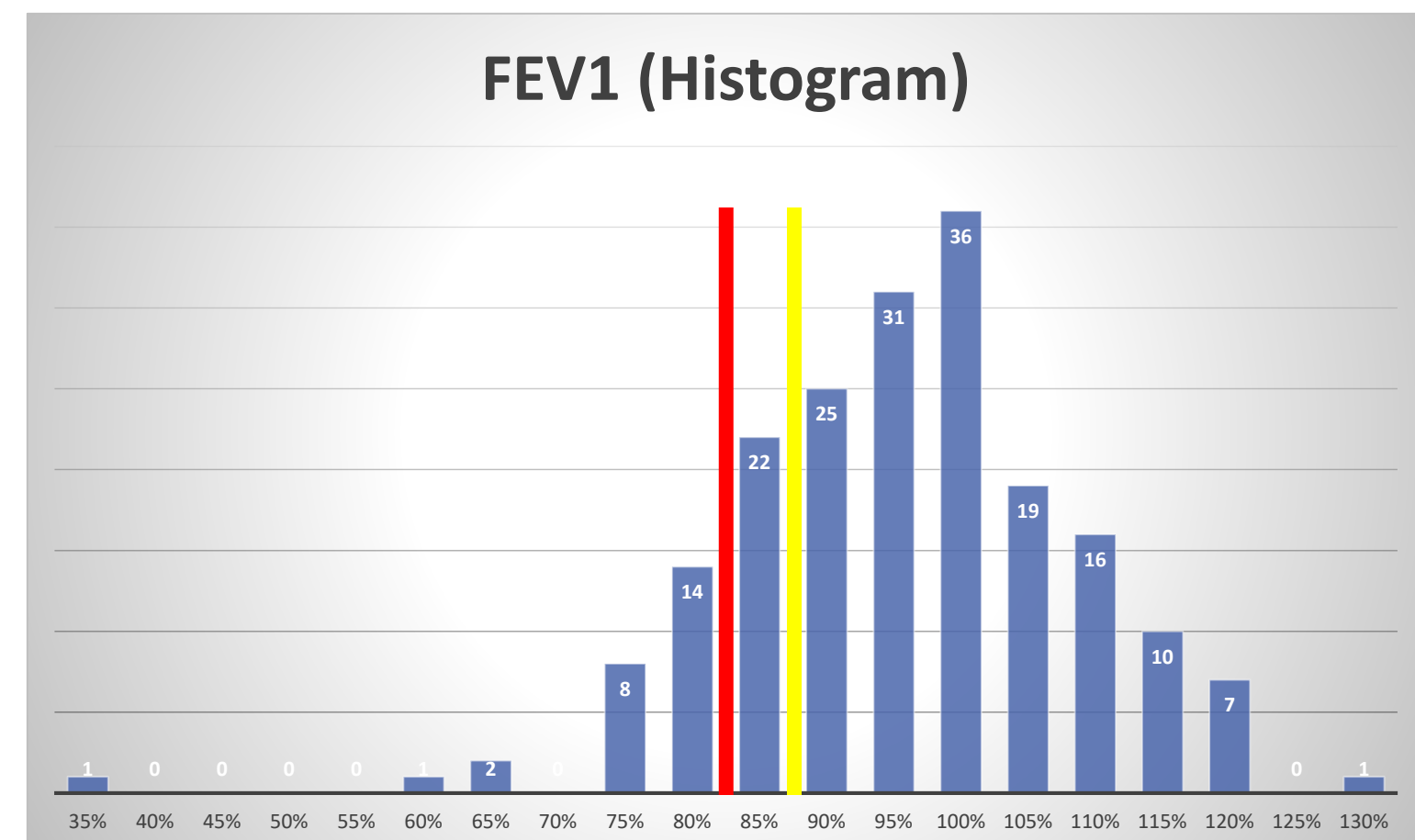
FVC Criteria		
Green	Yellow	Red
>85%	85-80%	< 80%
<ul style="list-style-type: none"> No indication for referral Continue annual screening 	<ul style="list-style-type: none"> Indication for referral if symptomatic or other health concerns Consider repeat testing or shorter interval screening 	<ul style="list-style-type: none"> Indication for referral to formal pulmonary testing Removal from duties until PFT results exclude presence of disease

Design – Longitudinal Changes

Evidence Based Criteria

- No clear recommendation or interval changes in spirometry findings over time to warrant further testing.
- Based on clinical practice, a change of 10-15% from baseline over the course of evaluation is considered significant regardless if patient meets the previously defined screening criteria
- Referrals should be made for any patient showing consistent decline beyond baseline for age/height adjust expected values on all spirometry levels.

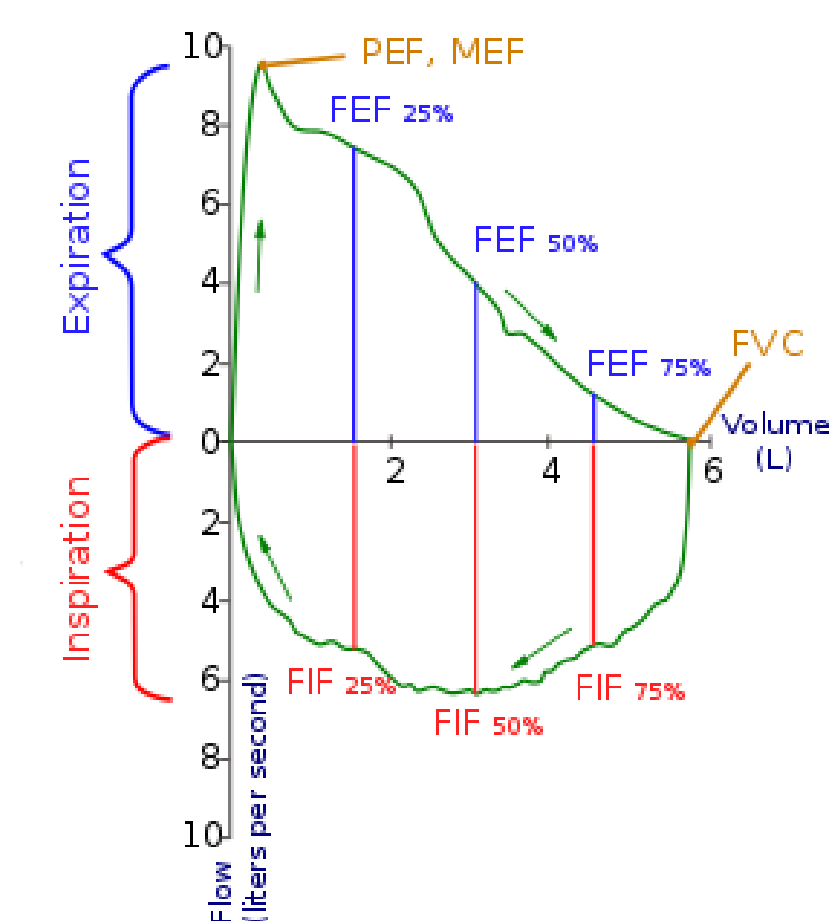
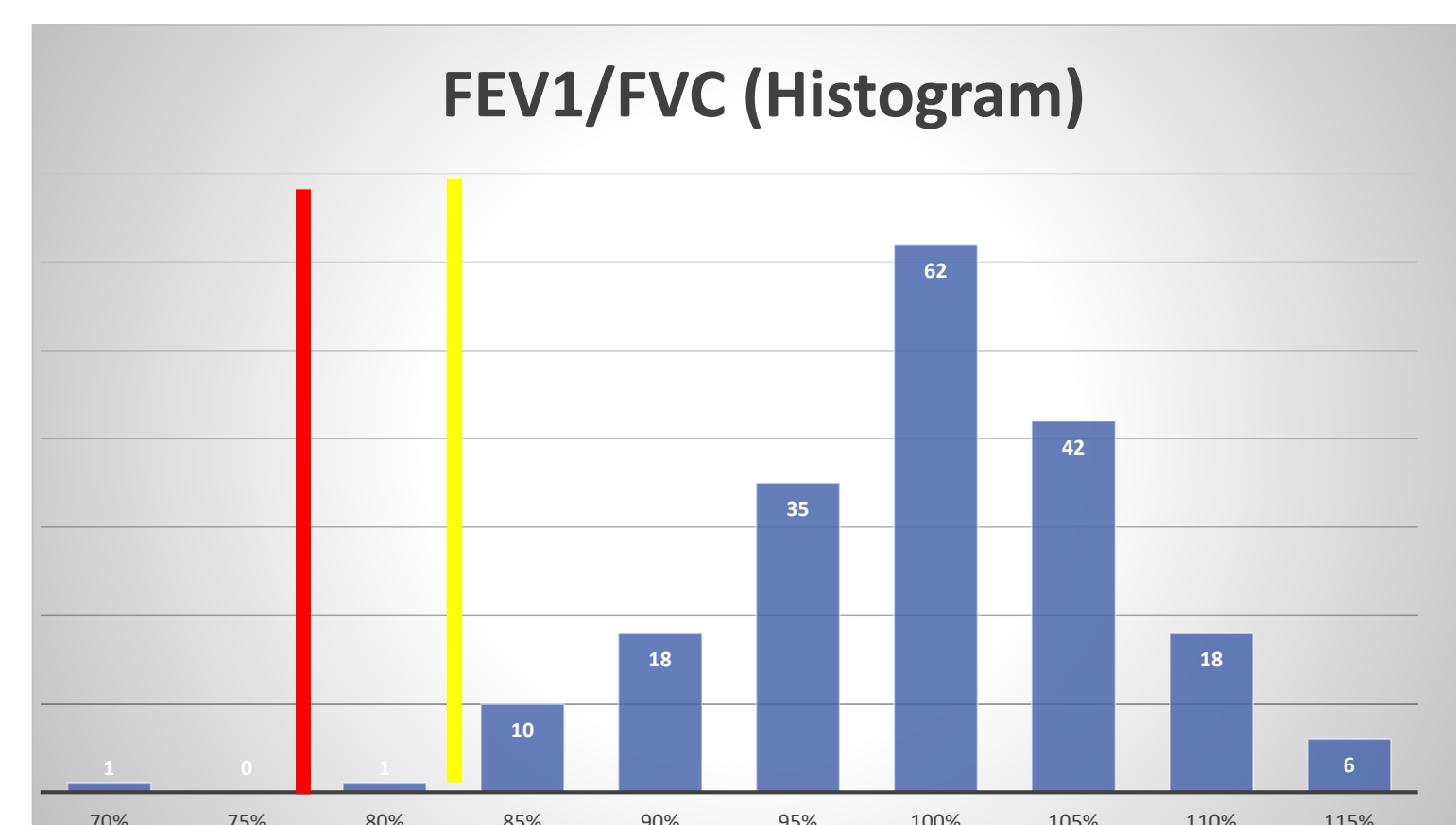
Design - Obstructive Process



Evidence Based Criteria

- An FEV1/FVC ratio < 70% of predicted for age and height has historically been used for screening for obstructive process. However, this level can miss early onset of disease especially in a young population (Johnson & Theurer, 2014).
- The ATS recommends using the LLN for the diagnostic purposes. For our study, an FEV1/FVC < 75% was considered optimal based on the range of LLN for the patient population.
- FEV1 has been defied to be normal if its values range between 80% to 120% (Barreiro & Perillo, 2004).

FEV1 Criteria		
Green	Yellow	Red
>85%	85-80%	< 80%
<ul style="list-style-type: none"> No indication for referral Continue annual screening 	<ul style="list-style-type: none"> Indication for referral if symptomatic or other health concerns Consider repeat testing or shorter interval screening 	<ul style="list-style-type: none"> Indication for referral to formal pulmonary testing Removal from duties until PFT results exclude presence of disease



FEV1/FVC Criteria		
Green	Yellow	Red
>80%	80-75%	< 75%
<ul style="list-style-type: none"> No indication for referral Continue annual screening 	<ul style="list-style-type: none"> Indication for referral if symptomatic or other health concerns Consider repeat testing or shorter interval screening 	<ul style="list-style-type: none"> Indication for referral to formal pulmonary testing Removal from duties until PFT results exclude presence of disease

Validate

	Green Zone		Yellow Zone		Red Zone	
	Range	Patients	Range	Patients	Range	Patients
FEV	100-85%	82%	85-80%	10%	<80%	8%
FEV1	100-85%	75%	85-80%	13%	<80%	11%
FEV1/FVC	100-80%	98%	80-75%	1%	<75%	1%
FEV25-75	100-85%	54%	85-80%	37%	<80%	9%
PEF	100-85%	78%	85-80%	10%	<80%	12%

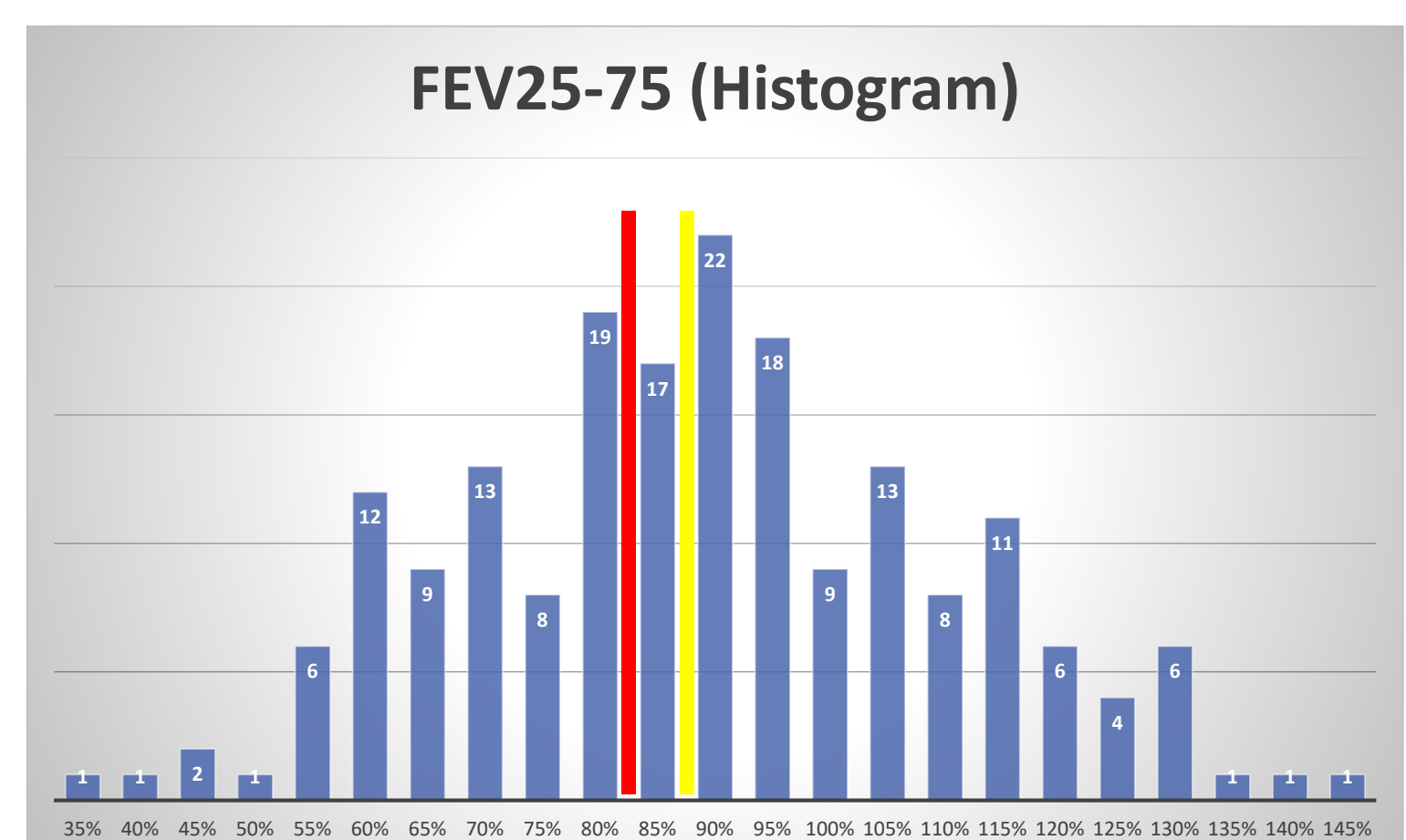
Key Data:

- Nearly **1 in 5 patients** have evidence of a borderline or full restrictive lung defect by spirometry
- Over **46% of patients** have signs of early small airway disease

Key Outcomes:

- Improved screening and referral pathways for patients spirometry data
- Clear guidelines regarding proactive detection of early pulmonary changes over longitudinal care
- Enhanced readiness as given greater visibility of population needs, status, and screening status.

Design – Small Airway Disease



Evidence Based Criteria

- Small air way disease is defined by a reduction in the FEF25-75% with normal FEV1, FVC, and FEV1/FVC (Marseglia et al., 2007). Application are controversial in some settings.
- FEF25-75% has a wide degree of variation. For the patient population studied with an average age between 18-35 years old, the normal range is considered between 80% to 120% (Stanojevic et al., 2008).

FEF25-75%		
Green	Yellow	Red
>85%	85-80%	< 80%
<ul style="list-style-type: none"> No indication for referral Continue annual screening 	<ul style="list-style-type: none"> Indication for referral if symptomatic or other health concerns Consider repeat testing or shorter interval screening 	<ul style="list-style-type: none"> Indication for referral to formal pulmonary testing if risk factors identified Consider work duty status based on current medical limitation

Selected References

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