

## BACKGROUND

- Electronic Medical Records (EMR) house discrete patient data points [but are difficult to access for decision making]
- To realize the potential of AI, clean, accurate, and standardized data is needed to fuel algorithm development
- Digital tools that harness data in EMR are being produced
- There is no national data standard for nutrition documentation, (e.g. “+PRO” for liquid protein or fortifier)
- Evidenced-based feeding protocols improve nutrition and neonatal outcomes in preterm infants
- Maintaining appropriate growth is essential to neonates

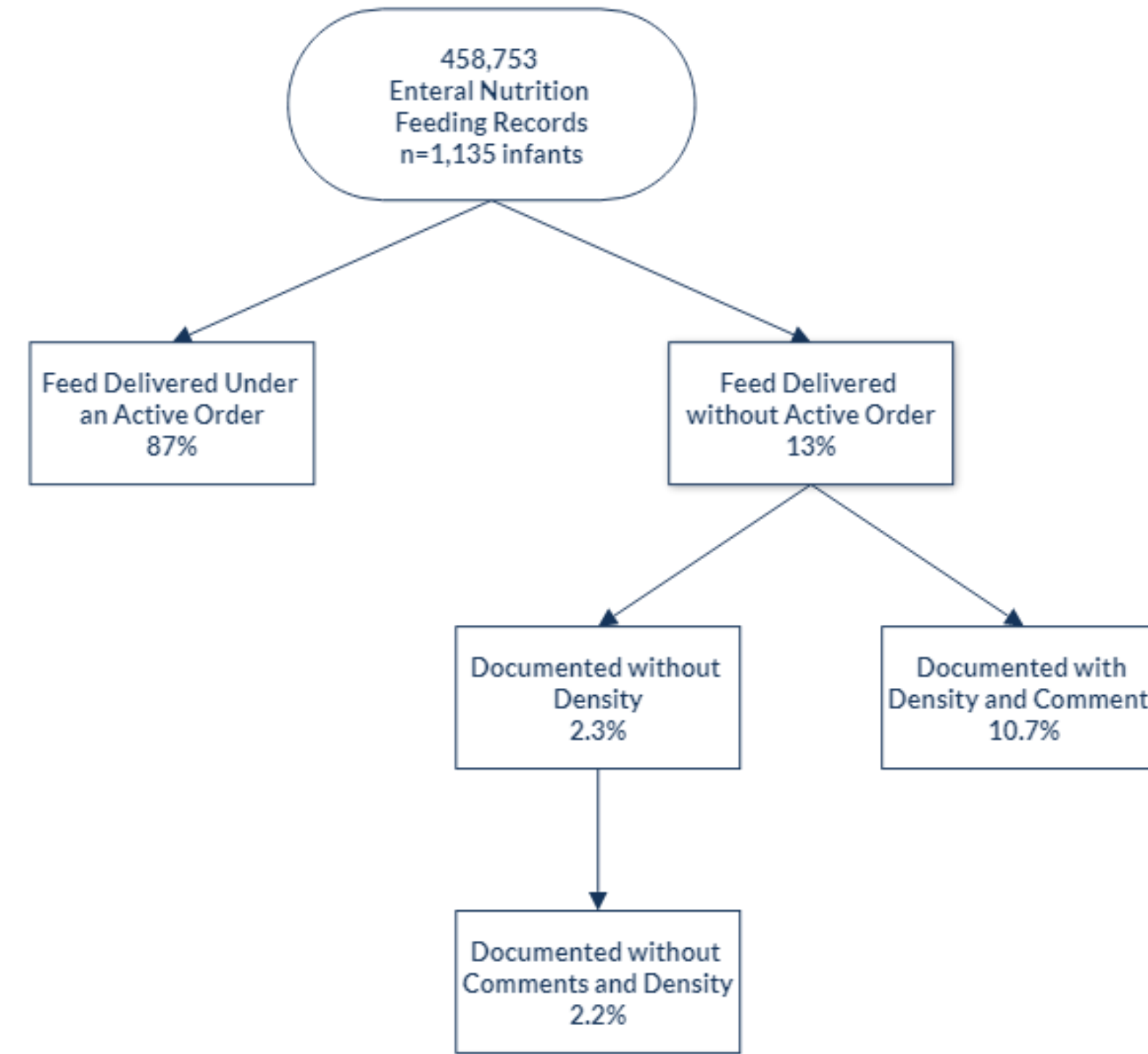
## PURPOSE AND HYPOTHESIS

- Develop a digital tool to access and structure granular feeding and nutrition data from the EMR
- Analyze the data to identify missing, incorrect, and inconsistent data
- Data quality challenges exist at the order level as well as in documentation of feed delivery
- Structure the data for feeding models targeting nutrition-related outcomes and quality improvement initiatives
- Provide data driven metrics to improve implementation of and adherence to feeding protocols

## MATERIALS AND METHODS

- An EMR-integrated application was developed that extracted data directly using secure Fast Healthcare Interoperability Resources Application Programming Interfaces (FHIR APIs)
- An open source, python-based natural language processing (NLP) tool was used to analyze feeding orders and recipes
- An intuitive, user-friendly display was developed applying a proprietary NutritionIQ framework

## Meta Data: Comprehensive/Quality



NICUtrition<sup>®</sup>  
by Astarte Medical

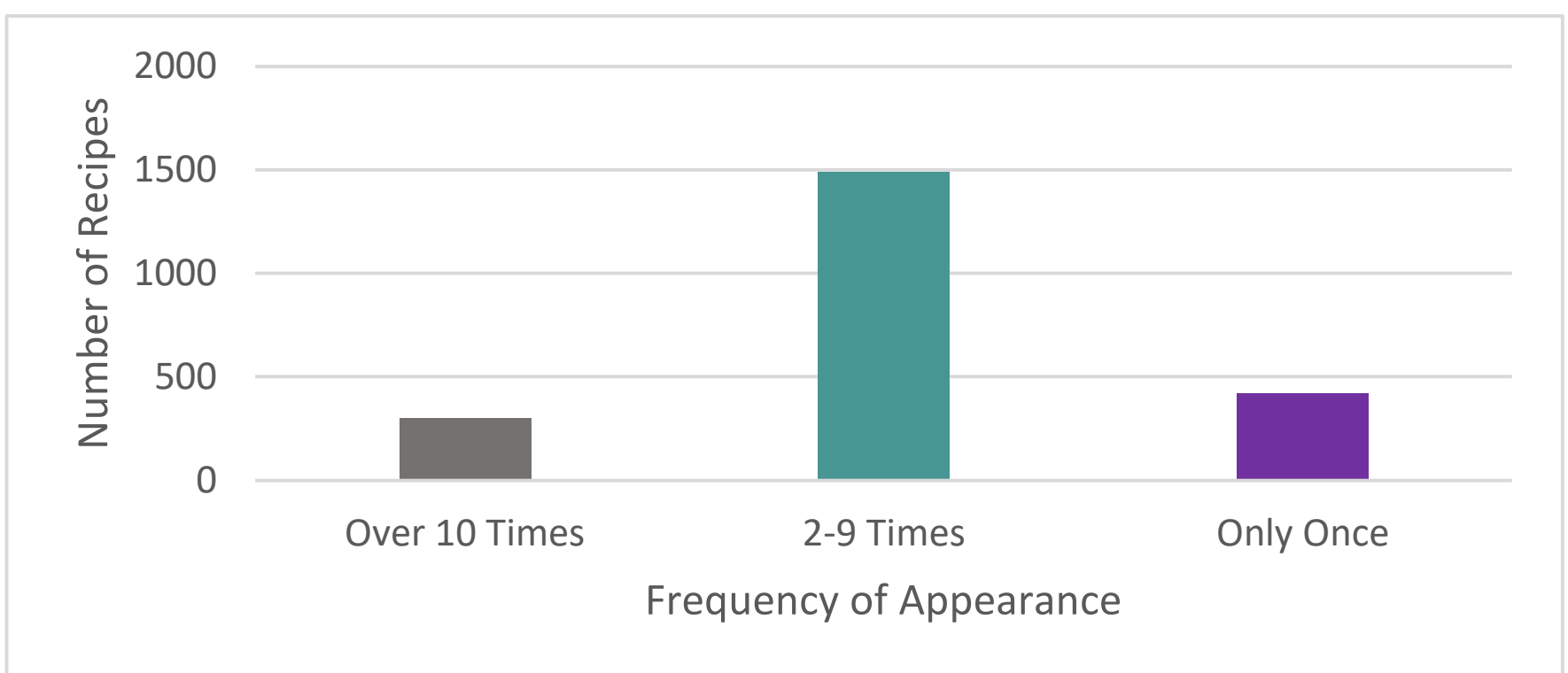
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MRN	Birth GA (weeks)	Sex	Protocol Adherence	Birth Weight (g)	Birth Weight Percentile	Birth Weight Category	Co Morbidities	First Enteral Feed (days)	RTBW (days)	Avg. Growth Vel. (g/kg/day)	LOS (days)	Discharge Weight (g)	Discharge Weight Percentile
20675891	30 6/7	M	70%	1680	66%	AGA	No	2	13	11.8	83	4026	38%
20426336	29 5/7	F	52%	1200	42%	AGA	ROP	5	24	18.0	48	2068	5%
20496258	29 1/7	F	41%	1525	91%	LGA	No	4	19	14.4	47	2440	35%
20364578	28 0/7	F	67%	1050	56%	AGA	No	6	11	15.3	52	2140	20%
20215986	30 3/7	M	72%	850	3%	SGA	No	4	15	15.8	59	1871	0%
20118569	31 1/7	M	85%	1855	78%	AGA	No	4	8	15.0	43	3169	64%
20779635	32 3/7	M	68%	1977	60%	AGA	No	7	7	14.3	24	2585	37%
20555698	28 2/7	F	50%	1050	49%	AGA	BPD	9	13	11.2	92	2757	2%
20036954	27 6/7	M	60%	1080	54%	AGA	No	3	13	15.1	71	2732	17%
20145896	31 6/7	F	74%	1870	73%	AGA	Sepsis	5	20	11.4	80	4070	52%
20079654	29 0/7	F	80%	1440	87%	AGA	No	5	10	16.9	39	2505	72%
20333947	26 4/7	F	45%	970	75%	AGA	NEC	2	11	12.4	102	3320	27%
20444982	29 2/7	M	62%	1560	87%	AGA	No	3	16	14.3	47	2550	34%
20344779	32 6/7	M	79%	1796	31%	AGA	No	5	16	9.4	100	4605	15%
<b>Averages:</b>			<b>60%</b>					<b>6</b>	<b>14</b>	<b>14.0</b>	<b>92</b>		

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## RESULTS

- 1,135 preterm infants <34 weeks GA with data
- 135 excluded for several issues including:
  - Missing/incorrect GA, BW, short length of stay (<24hrs)
  - Other errors in charting – inaccurate weights, lengths, head circumferences (ex: BW 3.89g, length 3.2cm, HC 315cm)
- 41,141 orders analyzed for 2,217 unique recipes
  - 80% of orders interpreted by 115 NLP sentences
  - 90% of orders using 515 NLP sentences
  - >1000 orders occurred 2 or fewer times (see graph)
- Example recipe (feed order)
  - Breast Milk, Expressed 20 kcal/oz with EHMf to 24 kcal/oz + Enfacare to 26kcal/oz



## CONCLUSIONS

- Implementing software that harnesses EMR data can help with early identification of “user input” error
- Need to streamline feeding orders to decrease variability and error
- Process improvements relating to comprehensive documentation needed to improve reliability of the data
- Structuring data in tool will enable tracking of protocol compliance and nutrition-related milestones
- Compliance to protocols can reduce variability in data quality and practice
- Improving the reliability of EMR data will enable the development of AI algorithm development