



RUMAH SAKIT JAKARTA

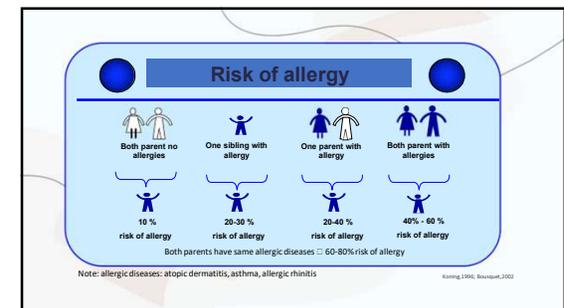
## TATA LAKSANA ALERGI SUSU SAPI DENGAN ISOLAT PROTEIN SOYA

Dita Setiati  
Departemen Ilmu Kesehatan Anak FK Trisakti/RS Jakarta

- ### Topik
- Pendahuluan
  - Alergi susu sapi
  - Dampak alergi susu sapi terhadap tumbuh kembang anak
  - Tata laksana alergi susu sapi
  - Kesimpulan

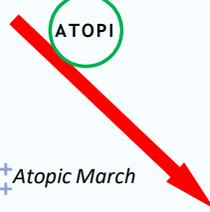


- ### Penyakit Alergi
- Penyakit alergi: asma, rinitis alergi, dermatitis atopik (eksim).
  - Angka kejadian penyakit alergi di dunia, termasuk pada anak, meningkat dari tahun ke tahun.
  - Penyakit alergi dapat merugikan proses tumbuh kembang anak bila tidak ditangani dengan baik.



### Mengapa penyakit alergi harus dikenali dan ditangani secara dini?

**ATOPI**



Atopic March

Alergi Makanan

Eksim

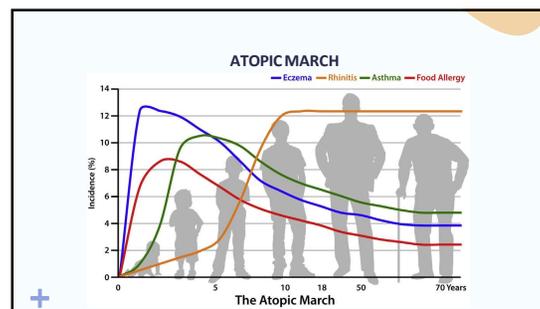


Asma



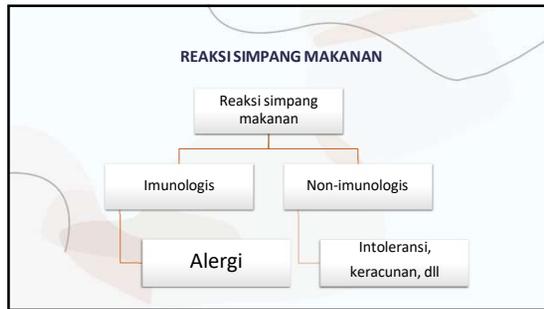
Rinitis Alergi





### ALERGI SUSU SAPI





### ALERGI SUSU SAPI

Kasein dan whey adalah protein dalam susu sapi yang menyebabkan reaksi alergi. Reaksi-reaksi ini dapat diperantarai IgE atau non-IgE. Reaksi alergi yang diperantarai IgE cenderung memiliki manifestasi klinis yang lebih berat, memakan waktu lebih lama untuk sembuh tetapi lebih mudah untuk mendiagnosisnya

Angka kejadian :  
0,5% - 7,5%

Dimulai di usia dini (< 1 tahun) dan angka kejadian berkurang dengan bertambahnya usia

Manifestasi terbanyak:  
Dermatitis Atopik (35%)



### Protein susu sapi

Fraction	Protein	Allergen Name	g/L	% Total Protein	SDS (kDa)	Number of aa	pI
Casein	Alpha <sub>1</sub> -casein	Bov d 4	~30	80	—	—	—
			12-15	29	23.6	199	4.9-5.6
Heat stable	Alpha <sub>2</sub> -casein	Bov d 5	3-4	8	24.2	207	5.2-5.4
			9-11	27	24.0	209	5.1-5.4
Whey proteins	Gamma <sub>2</sub> -casein	Bov d 6	1-2	6	20.6	160	5.3
	Gamma <sub>1</sub> -casein		11.6	11.6	104	6.4	
	Gamma <sub>3</sub> -casein		11.6	11.6	102	5.8	
Whey proteins	Kappa-casein	Bov d 7	3-4	10	19.0	159	5.4-5.6
	Alpha <sub>1</sub> -lactalbumin		Bov d 8	1.5-1.5	2	14.2	123
Heat labile	Beta <sub>2</sub> -lactoglobulin	Bov d 9	3.4	10	18.3	162	5.3
	Igammaglobulin	Bov d 7	0.6-1.6	3	161.0	—	—
Whey proteins	Bovine serum albumin	Bov d 6	0.1-0.4	1	67.0	583	4.9-5.1
	Lactoferrin	—	0.09	Trace	800.0	703	8.7
Total proteins			36.0	100	—	—	—

Takatori S, et al. Endocr Metab Immun Disord Drug Targets. 2014;14:16-26



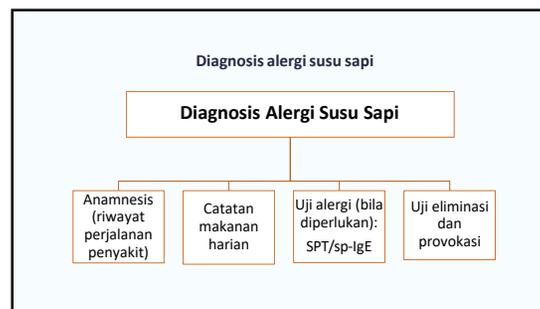
### Gejala Alergi Susu Sapi

- Profil gejala pada bayi:** biasanya lebih dari satu gejala
- Gejala paling sering:** Eksim/dermatitis atopik, diare berdarah, regurgitasi, muntah, bengkak bibir dan kelopak mata (angioedema), urtikaria, ruam
- Gejala yang sering mengkhawatirkan orang tua:** Kolik
- Gejala berat:** Anafilaksis
- Gejalanya sering tumpang tindih dengan:** Permasalahan bayi lainnya (yang bukan karena alergi)



### Gejala klinis berdasarkan tipe alergi susu sapi

	Dimediasi IgE Onset akut	Tidak dimediasi IgE Onset lambat	Tipe campuran
Saluran cerna	Oral allergy syndrome;	Proktokolitis Food Protein Induced Enterocolitis GERD Konstipasi kronik Kolik infantil	Esofagitis eosinofilik
Saluran napas	Rinitis, asma	Penyakit paru kronik (Heiner's syndrome)	Asma
Skin	Urtikaria; angioedema		Dermatitis atopik
Sistemik	Anafilaksis		



### DAMPAK ALERGI SUSU SAPI

### Dampak alergi susu sapi terhadap tumbuh kembang anak

**BDA** Journal of Human Nutrition and Dietetics

**RESEARCH PAPER**  
International survey on growth indices and impacting factors in children with food allergies

**Methods:** A prospective growth survey was performed of children (aged 0–16 years) on an elimination diet with confirmed immunoglobulin (IgE) and non-IgE mediated food allergies. Data collected included: weight-for-age, weight-for-height, height-for-age, head circumference, body mass index, type of food allergy and eliminated foods, allergic comorbidities and replacement milk/ breast milk. Multivariable regression analysis was used to establish factors that affected growth.

**Results:** Data from 430 patients from twelve allergy centres were analysed: median age at diagnosis and data collection was 8 months and 23 months, respectively. Pooled data indicated that 6% were underweight, 5% were stunted, 5% were undernourished and 8% were overweight. Cow's milk elimination lead to a lower weight-for-height Z-scores than other food eliminations and mixed IgE and non-IgE mediated allergy had lower height-for-age Z-scores than IgE mediated allergy. Children with only non-IgE mediated allergies had lower weight-for-height and body mass index. Atopic comorbidities did not impact on growth.

**Conclusions:** Stunting is more common in children with food allergies than low weight. Children particularly at risk of poor growth are those with non-IgE and mixed IgE and non-IgE mediated allergies, as well as those with cow's milk allergy.

### Reduced Final Height and Inadequate Nutritional Intake in Cow's Milk-Allergic Young Adults

**Table 1. Demographic and clinical parameters, and anthropometric measurements of patients with IgE-CMA versus controls**

Growth parameter	IgE-CMA n= 87	Control n= 34
Age (y), median (IQR)	19.5 (17.3, 22.7)**	22.7 (18.5, 26.1)
Male gender	38 (43.7%)	15 (44.7%)
Asthma	47 (54.0%)*	2 (5.6%)
Additional food allergies	30 (34.5%)*	3 (8.3%)
Height (cm)	164.7 (8.2)*	168.5 (7.7)
Weight (kg)	60.9 (11.4)	62.5 (10.3)
BMI, median (IQR)	21.9 (20.3, 23.9)	22 (19.7, 24)
Height z-score <sup>1</sup>	-0.61 (0.90)**	-0.04 (0.68)
Weight z-score <sup>2</sup>	-0.32 (1.1)	-0.12 (0.82)
BMI z-score <sup>3</sup>	-0.02 (-0.47, 0.57)	-0.015 (-0.7, 0.6)
Di height MPH (cm) <sup>4</sup>	-0.9 (4.9)**	-0.6 (5.2)
Di height MPH z-score <sup>5</sup>	-0.55 (0.72)**	-0.06 (0.78)

**Figure 1:** Bar chart showing Height z-score in patients with IgE-CMA versus controls. The y-axis is Height z-score (ranging from -2 to 2) and the x-axis is Height Z-score (Control and CMA). The CMA group shows significantly lower height z-scores compared to the Control group (p=0.002).

Peneliti	Subyek	Hasil
Isolaure, dkk. 1998	N=100 Anak terkonfirmasi ASS dimediasi IgE dipantau sampai usia 24 bulan. Kelompok kontrol adalah anak sehat.	Rerata z-score tinggi untuk usia dan berat badan untuk usia lebih rendah pada anak dengan ASS dibandingkan kelompok kontrol secara bermakna.
Madeiraso, dkk. 2004	N=26 anak ASS dibandingkan dengan 30 anak sehat (age matched).	Stunting: 11,5% (ASS), 0% (kontrol) Gizi kurang: 23% (ASS), 3,3% (kontrol) Wasting: 7,7% (ASS), 0% (kontrol)
Veiera, dkk. 2010	N=159 anak ASS dengan gejala utama di saluran cerna	Stunting: 23,9%, Wasting: 11,3% Gizi kurang: 15,1%
Canani, dkk. 2014	N=85 anak dengan alergi makanan (80/85 ASS). Evaluasi pertumbuhan pasien sebelum dan sesudah asuhan nutrisi yang adekuat dan dibandingkan dengan anak normal.	Anak dengan alergi makanan mempunyai parameter pertumbuhan yang lebih rendah secara bermakna dibandingkan dengan anak tanpa alergi. Setelah konseling asuhan nutrisi, terdapat kenaikan yang bermakna pada parameter pertumbuhan dan hampir mendekati anak sehat dalam waktu 6 bulan.

Meyer R. Pediatr Allergy Immunol. 2018;29:689-704

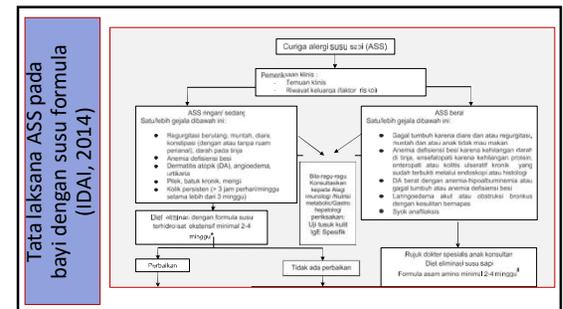
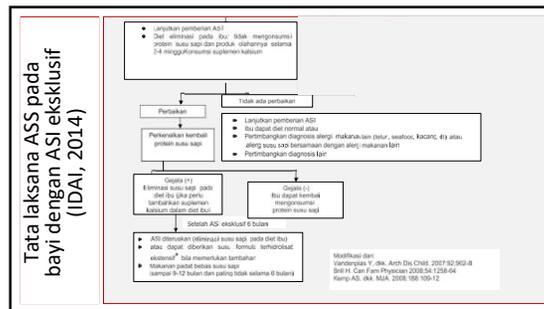
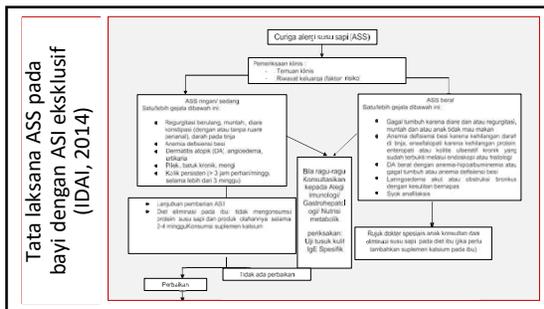
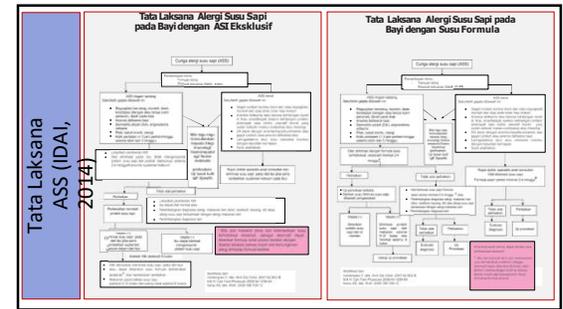
### Risiko penyakit alergi di usia remaja/dewasa pada anak dengan ASS

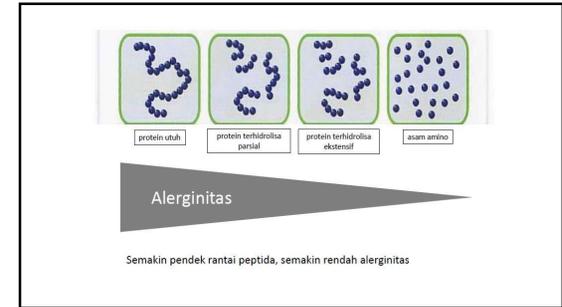
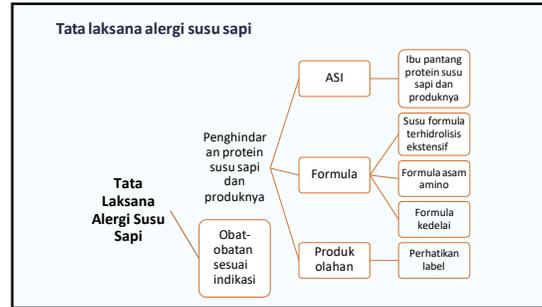
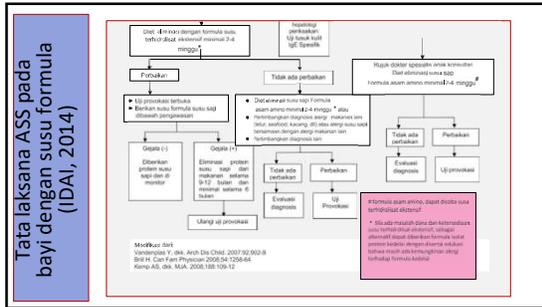
15 years	Group A, n = 33 (4%)	95% CI	Group B, n = 215 (4%)	95% CI	P-value (P)
Atopic dermatitis	6 (18%)	4%-32%	41 (19%)	14%-24%	.504
Asthma	10 (30%)	14%-47%	34 (16%)	11%-21%	.044
Rhinoconjunctivitis	12 (36%)	19%-54%	40 (19%)	13%-24%	.020
26 years	Group A, n = 33 (4%)	95% CI	Group B, n = 193 (4%)	95% CI	P-value (P)
Atopic dermatitis	7 (21%)	6%-36%	12 (6%)	3%-10%	.004
Asthma	10 (30%)	14%-47%	16 (8%)	4%-12%	.000
Rhinoconjunctivitis	14 (42%)	25%-60%	58 (30%)	24%-37%	.159

A: Kelompok subyek dengan ASS  
B: Kelompok kontrol

Pediatr Allergy Immunol. 2021;00:1-7.

## TATA LAKSANA ALERGI SUSU SAPI





### Nama lain protein susu sapi/turunnannya

<ul style="list-style-type: none"> <li>- Acidophilus milk</li> <li>- Ammonium caseinate</li> <li>- Butter</li> <li>- Butter fat</li> <li>- Butter oil</li> <li>- Butter solids</li> <li>- Buttermilk</li> <li>- Buttermilk powder</li> <li>- Calcium caseinate</li> <li>- Casein</li> <li>- Caseinate (in general)</li> <li>- Cheese (all animal or based)</li> <li>- Condensed milk</li> <li>- Cottage cheese</li> <li>- Cream</li> <li>- Curds</li> <li>- Custard</li> <li>- Delactosed whey</li> <li>- Demineralized whey</li> <li>- Dry milk powder</li> <li>- Dry milk solids</li> <li>- Evaporated milk</li> </ul>	<ul style="list-style-type: none"> <li>- Ghee</li> <li>- Goat milk</li> <li>- Half &amp; Half</li> <li>- Hydrolyzed casein</li> <li>- Hydrolyzed milk protein</li> <li>- Iron caseinate</li> <li>- Lactalbumin</li> <li>- Lactoferrin</li> <li>- Lactoglobulin</li> <li>- Lacto(ol)lacton</li> <li>- Lactulose</li> <li>- Low-Fat milk</li> <li>- Magnesium caseinate</li> <li>- Malted milk</li> <li>- Milk</li> <li>- Milk, derivative</li> <li>- Milk fat</li> <li>- Milk powder</li> <li>- Milk protein</li> <li>- Milk solids</li> <li>- Natural butter flavor</li> <li>- Nonfat milk</li> </ul>	<ul style="list-style-type: none"> <li>- Nougat</li> <li>- Paneer</li> <li>- Potassium caseinate</li> <li>- Pudding</li> <li>- Recaldent</li> <li>- Rennet casein</li> <li>- Slim milk</li> <li>- Sodium caseinate</li> <li>- Sour cream</li> <li>- Sour milk solids</li> <li>- Sweetened condensed milk</li> <li>- Sweet whey</li> <li>- Whey</li> <li>- Whey powder</li> <li>- Whey protein concentrate</li> <li>- Whey protein hydrolysate</li> <li>- Whipped cream</li> <li>- Whipped topping</li> <li>- Whole milk</li> <li>- Milk solids</li> <li>- Yogurt</li> <li>- Zinc caseinate</li> </ul>
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- ### Formula isolat protein kedelai/soya
- Keuntungan formula isolat protein kedelai dibandingkan susu protein hidrolisis ekstensif:
    - Tidak mempunyai protein susu sapi
    - Rasa lebih enak
    - Harga lebih murah
  - Formula isolat protein kedelai sudah diolah sehingga dapat memenuhi kebutuhan nutrisi anak.

- ### Formula isolat protein soya vs Susu soya
- Formula isolat protein soya dan susu soya adalah 2 produk yang berbeda.
  - Formula soya** dibuat dari protein soya dan nutrisi lainnya yang sudah didesain spesifik untuk memenuhi kebutuhan nutrisi bayi/anak.
  - Susu soya** dibuat dari kacang kedelai dan campuran air. Susu ini tidak mengandung kebutuhan nutrisi yang dibutuhkan anak dan **tidak boleh** digunakan sebagai pengganti ASI atau susu formula untuk bayi di bawah usia 2 tahun.

### Perbandingan komposisi nutrisi antara human milk (HM), cow's milk (CM), soy-based beverages (SB), soy-based infant formula as regulated by EU (SIF-EU), dan Italian commercialized soy-based formula (SF).

	HM <sup>a</sup>	CM <sup>a</sup>	SB <sup>b</sup>	SIF-EU <sup>c</sup>	SF <sup>d</sup>
<b>COMPOSITION IN 100 g</b>					
Energy (kcal)	70	62	32	60-70	67-68
Water (g)	87.5	87.7	89.7		
Total protein (g)	1.0	3.3	2.9	1.35-1.96	1.6-1.7
Total fat (g)	4.4	3.3	1.9	2.64-4.2	3.3-3.5
Lactose	6.9	4.7			
<b>MINERALS</b>					
Calcium (mg)	32	112	13	30-96	55-68
Iron (mg)	0.1	0.4	0.0	0.18-0.91	0.9-1.1
Magnesium (mg)	3	11		3-10.5	
Phosphorus (mg)	14	91		15-63	39-40
Potassium (mg)	51	145	120	48-112	66-77
Sodium (mg)	17	42	32	15-42	20-27
Zinc (mg)	0.2	0.4	0.2	0.3-0.7	
Copper (µg)	100			36-70	
Selenium (µg)	1.8	1.8		1.8-6.02	
Manganese (µg)		8		-70	

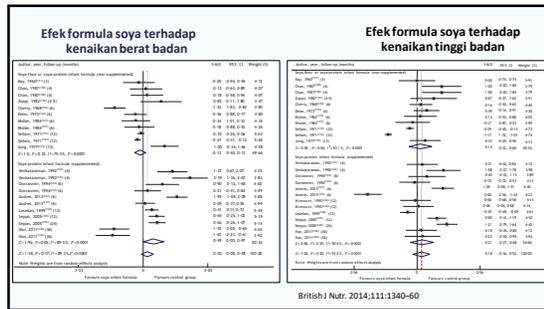
- ### Formula isolat protein kedelai/soya
- Penambahan berat badan, tinggi badan, kadar protein dan mineralisasi tulang yang normal.
  - Formula isolat protein kedelai tidak dapat diberikan pada bayi prematur atau bayi dengan gagal ginjal.
  - Aleri kedelai pada anak alergi susu sapi:
    - Dimediasi IgE: 10-20%
    - Tidak dimediasi IgE: 50-60%
  - Kejadian alergi kedelai pada anak dengan alergi susu sapi lebih besar pada bayi di bawah usia 6 bulan.

### Systematic Review with Meta-Analysis

#### Safety of soya-based infant formulas in children

Yuan Vandegheer<sup>a</sup>, Pedro Gutierrez Caballero<sup>a</sup>, Rodolfo Ruiz<sup>a</sup>, Carlos Jimenez Galimán<sup>a</sup>, Ismael Diaz Garcia<sup>a</sup>, Juliana Estroze Jimenez<sup>a</sup>, Anahi Arzo<sup>a</sup>, Beatriz Heguer<sup>a</sup> and Pedro Alvarez<sup>a</sup>

**Abstract**  
Soya-based infant formulas (SIF) containing soya flour were introduced almost 100 years ago. Modern soya formulas are used in allergy/intolerance to cow's milk-based formulas (CMF), post-infectious diarrhoea, lactose intolerance and galactosaemia, as a vegan human milk (HM) substrate, etc. The safety of SIF is still debated. In the present study, we reviewed the safety of SIF in relation to anthropometric growth, bone health (bone mineral content), immunity, cognition, and reproductive and endocrine functions. The present review includes cross-sectional, case-control, cohort studies or clinical trials that were carried out in children fed SIF compared with those fed other types of infant formulas and that measured safety. The databases that were searched included PubMed (1969 to July 2020), Embase (1988 to May 2021), UTAACS (1990 to May 2021), ARTEMISA (13th edition, December 2022), Cochrane controlled trials registers, Handsearch and DARE using the Cochrane methodology. Whenever possible, a meta-analysis was carried out. We found that the anthropometric patterns of children fed SIF were similar to those of children fed CMF or HM. Despite the high levels of phytyls and phytosterols in SIF, HDL, serum protein, Zn and Ca concentrations and bone mineral content were found to be similar to those of children fed CMF or HM. We also found the levels of gonadotropin and dihydroepiandrosterone to be higher in children fed SIF; however, we did not find strong evidence of a negative effect on reproductive and endocrine functions. Immune measurements and neurocognitive parameters were similar in all the feeding groups. In conclusion, modern SIF are evidence-based safety options to feed children requiring them. The patterns of growth, bone health and metabolic, reproductive, endocrine, immune and neurological functions are similar to those observed in children fed CMF or HM.



### Kesembuhan alergi susu sapi

- Angka remisi:
  - Tahun pertama : 45-55%
  - Tahun kedua : 60-75%
  - Tahun ketiga : 90%

### Kesembuhan alergi susu sapi

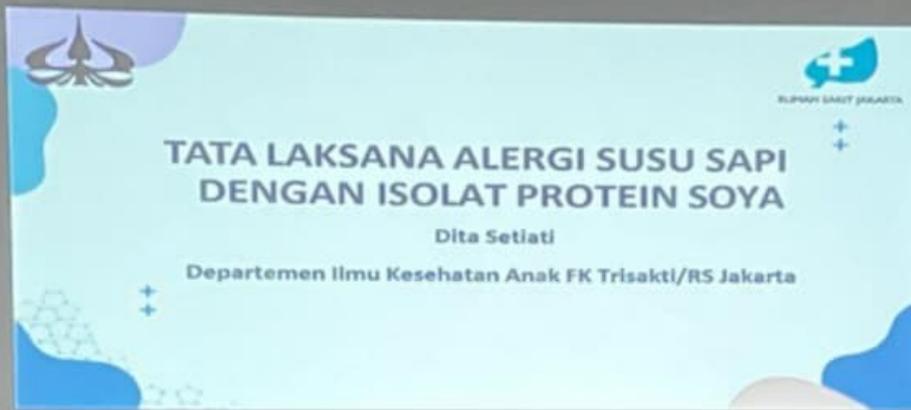
Age (years)	Recovery IgE (n = 21) / non-IgE (n = 18)	Recovery rate IgE / non-IgE %	95% CI IgE / non-IgE %	Recovery total (n = 39)	Recovery rate total %	95% CI total
1	9/13	42%/72%	20%-66%/49%-95%	22	56%	40%-72%
2	13/17	62%/94%	39%-85%/83%-100%	30	77%	61%-89%
3	16/18	76%/100%	56%-96%/100%-100%	34	87%	73%-96%
5	18/18	86%/100%	69%-100%/100%-100%	36	92%	79%-98%
10	18/18	86%/100%	69%-100%/100%-100%	36	92%	79%-98%
15	20/18	95%/100%	85%-100%/100%-100%	38	97%	87%-100%
26	20/18	95%/100%	85%-100%/100%-100%	38	97%	87%-100%

Pediatr Allergy Immunol. 2011;00:1-7.

### KESIMPULAN

- Penyakit alergi merupakan penyakit kronis pada anak yang dapat mengganggu tumbuh kembang anak apabila tidak ditangani dengan baik.
- Alergi susu sapi adalah salah satu bentuk alergi makanan yang dapat ditemukan pada usia dini.
- Tata laksana alergi susu sapi adalah dengan teruskan ASI (ibu pantang susu sapi dan produknya), formula hidrolisat ekstensif, formula asam amino, formula isolat protein kedelai, tergantung pada kondisi bayi.

## TERIMA KASIH





RUMAH SAKIT JAKARTA

# SERTIFIKAT

diberikan kepada :

dr. Dita Setiati, Sp.A

atas partisipasinya sebagai Narasumber pada Siang Klinik  
dengan judul  
**“Tata Laksana Alergi Susu Sapi dengan Isolat Protein Soya”**  
pada tanggal, 29 Januari 2026



dr. Andi Erlina, MARS, MH  
Direktur