UNIT 1: PROTEINURIA & HYPERTENSION—WITH AND WITHOUT TYPE 2 DM (2026 UPDATE)

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ABSTRACT

INTRODUCTION. This Chronic Disease Management Skills Course is a yearly update on the management of six chronic medical conditions. Unit 1 covers the update of management of proteinuria and hypertension based on papers published in 2024, 2025, and 2026. **METHODOLOGY.** PubMed searches were conducted from 1–3 March 2026. **RESULTS.** Of 15 shortlisted papers, four are included in this 2026 update, which covers the following topics: Proteinuria without hypertension and proteinuria with hypertension; Differences in cutoffs in the hypertension classifications of 2018 and 2024; Hypertension mechanisms and factors; Aetiology of advanced CKD in Southeast Asia; and Kidney function outcomes in T2DM patients in Singapore circa 2024. **CONCLUSIONS.** Ten take-home messages are provided.

Keywords: Proteinuria, hypertension, chronic kidney disease, and type 2 diabetes mellitus

Acknowledgements. Grateful thanks are due to the authors of the papers cited in this paper for the tables and figures reproduced.

INTRODUCTION

This chronic disease management skills course was initiated in 2019 as a yearly update of management of six chronic medical conditions prevalent in Singapore. This Unit is the 2026 update on the management of proteinuria and hypertension, in patients with and without type 2 diabetes mellitus.

METHODOLOGY

PubMed searches were conducted from 1–3 March 2026 for recent papers published on the topic of proteinuria and hypertension, both with and without type 2 diabetes mellitus. Keywords used were: Proteinuria, hypertension, chronic kidney disease, without diabetes mellitus, and type 2 diabetes mellitus. Literature searches were limited to Singapore and Southeast Asia and for the years 2024, 2025, and 2026. Of the 15 papers shortlisted in the March 2026 literature search, four were added to the list of references in this 2026 update.

RESULTS

1. WHAT'S NEW

1.1. Additional Benefits of SGLT2 Inhibitors in Glomerular Diseases Beyond Glucose Elimination[1]

A paper published by Del Vecchio L et al[1] in Feb 2026 showed that SGLT2 inhibitors provide more than just the benefits of glucose elimination. Additional benefits in patients with glomerular diseases include:

- Have consistent nephroprotective effects across diverse populations, including those with glomerular disease without diabetes mellitus.
- Modulate inflammatory pathways through suppression of cytokines.
- May offer therapeutic advantages beyond non-specific kidney-cardiovascular protection.

1.2. Risk of Antihypertensive Drugs on Rapid Decline in eGFR in Japanese Patients with CKD[2]

Risk of antihypertensive drugs on rapid decline in eGFR in Japanese patients with CKD has been studied by Kenta Fujimoto et al,[2] and their findings include:

- Rapid decline in eGFR (defined as annual reduction >25 percent) is linked to increased mortality and morbidity in CKD.
- Data from 100,740 Japanese individuals aged 4–70 showed the incidence of 5.8 percent of participants being affected.
- Controlling BP to high normal or elevated levels in patients receiving antihypertensives reduced this risk.[2]

1.3. Contemporary Review of IgA Nephropathy

IgA nephropathy **(**IgAN) is the most common primary glomerulonrephritis worldwide with increased prevalence in Asia Pacific populations and relative rarity in those of African descent. Some 20–50 percent of IgAN patients progress to kidney failure. The pathogenesis is incompletely understood. Biomarkers predicting adverse outcomes are: proteinuria, reduced GFR, hypertension, and pathology.[3]

The mainstay of treatment is supportive, consisting of lifestyle modifications, renin-angiotensin inhibition (if hypertensive or proteinuric), and sodium-glucose transporter 2 inhibition (if GFR reduced or proteinuric). Corticosteroids are controversial and carry a high risk of serious side effects; they are observed to have the most positive results in ethnic Chinese. Similarly, mycophenolate may be effective in the Chinese.[3]

1.4. Treatment of IgAN

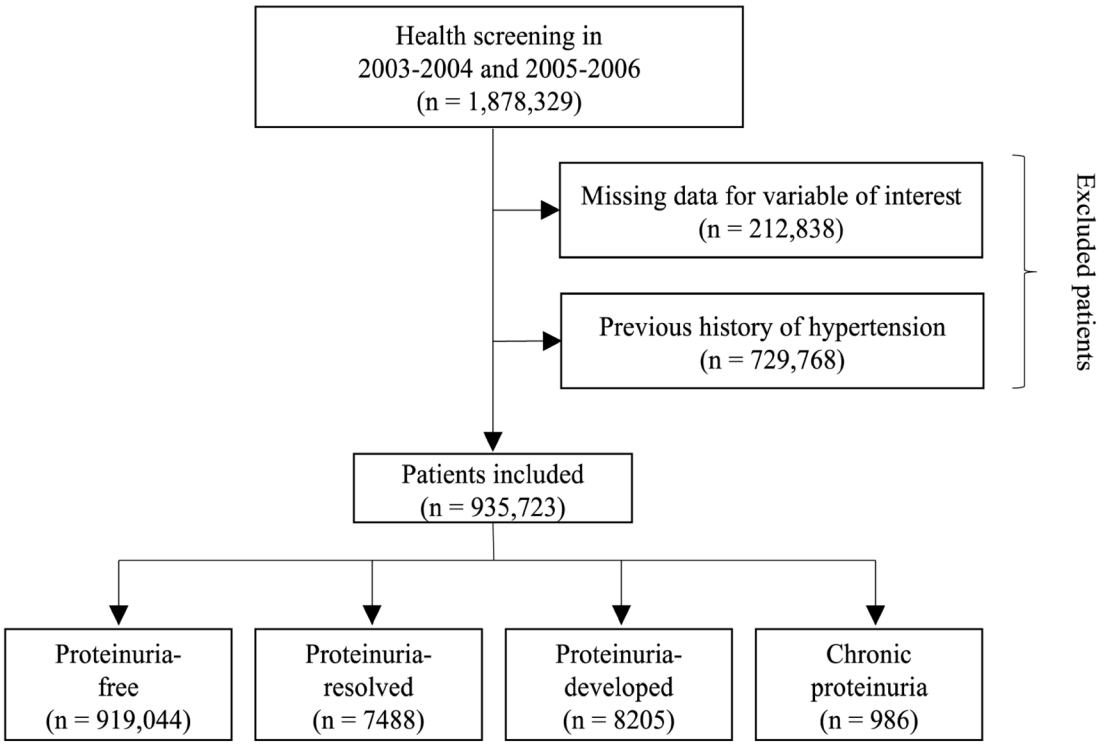
Dawn J Caster and Richard A Lafayette in a paper on treatment of igA nepropathy[4] noted that:

- SGLT2 inhibitors are likely to be effective;
- Endothelin blockade is effective; and
- Complement inhibition is effective.[4]

2. WHAT IS KNOWN

2.1. Proteinuria without Hypertension and Proteinuria with Hypertension

Figure 1. Proteinuria without hypertension



Source. Lee H, Park MS, Kang MK et al. 2023. PMID:37763181[5]

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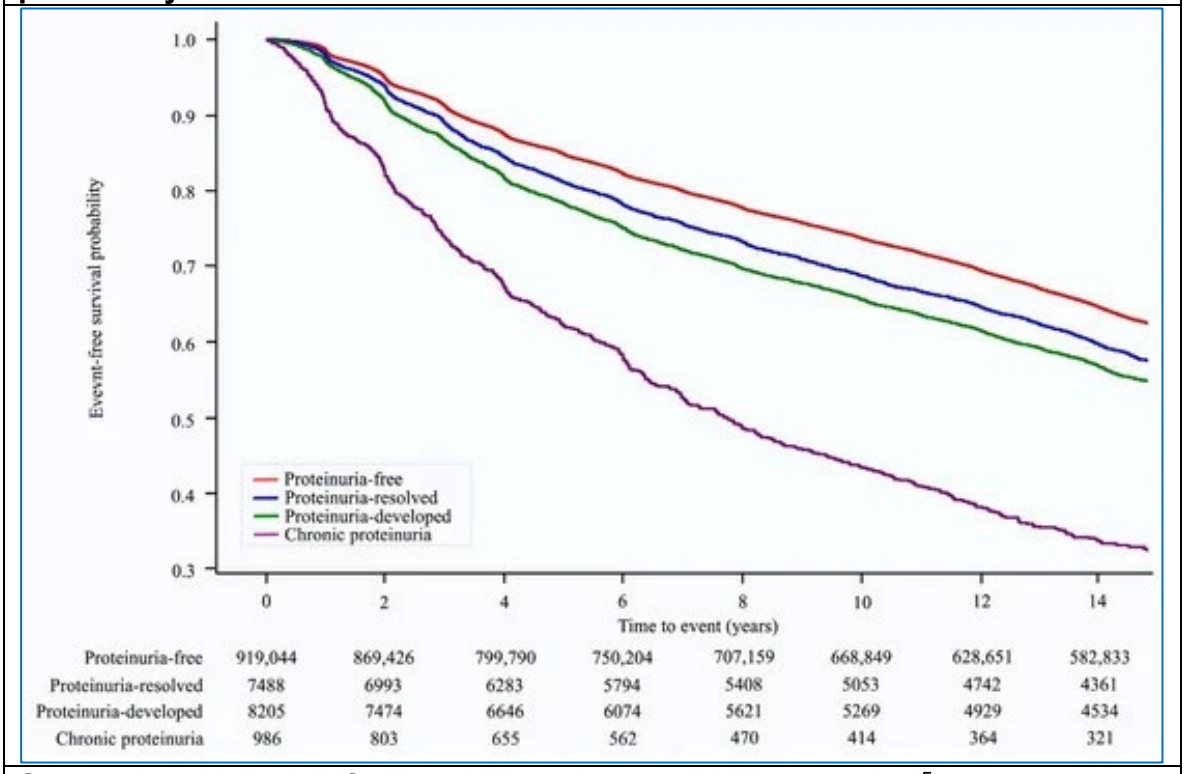
Figure 2. Proteinuria without hypertension and event-free survival probability



Source. Lee H, Park MS, Kang MK et al. 2023. PMID:37763181[5]

Table 1. Proteinuria without hypertension. Multivariable Cox Analysis for incident hypertension by changes in proteinuria status

Group	Total (n)	Hypertension (n)	Incidence Rate (per 1000 Person Years)	HR (95% Confidence Interval)		
				Model 1	Model 2	Model 3
Proteinuria-free	919,044	339,260	31.5	1 (ref)	1 (ref)	1 (ref)
Proteinuria-resolved	7488	3131	37.4	1.19 (1.15, 1.23)	1.17 (1.13, 1.21)	1.17 (1.13, 1.21)
Proteinuria-developed	8205	3638	41.3	1.31 (1.27, 1.35)	1.31 (1.27, 1.35)	1.31 (1.26, 1.35)
Chronic proteinuria	986	657	81.4	2.61 (2.41, 2.81)	2.11 (1.95, 2.27)	2.09 (1.94, 2.26)
		p for trend		<0.001	<0.001	<0.001

Footnotes:
Model 1 was adjusted for age and sex
Model 2 was adjusted for age, sex, body mass index, household income, smoking, alcohol consumption, physical activity, history of diabetes mellitus, dyslipidaemia, atrial fibrillation, cancer, and renal disease
Model 3 was adjusted for age, sex, body mass index, household income, smoking, alcohol consumption, physical activity, history of diabetes mellitus, dyslipidaemia, atrial fibrillation, cancer, renal disease, and Charlson Comorbidity Index
HR = hazard ratio
CI = confidence interval

Source. Lee H, Park MS, Kang MK et al. 2023. PMID:37763181[5]

Lee et al[5] in 2023 reported on the outcome of such patients as well as the risk of developing hypertension using the screening data from the Korean National Health Insurance Database. Data from participants without prior hypertension history who underwent their first health examination in 2003–2004 and a second examination in 2005–2006 were included in the study. Records with missing data for variable of interest, and patients with previous history of hypertension were excluded. A total of 935,723 patients were included in their study.

Based on their proteinuria status during these two examinations, participants were classified into four groups: the proteinuria-free; proteinuria-resolved; proteinuria-developed; and chronic proteinuria groups. See **Figure 1**.

The study outcome was the incidence of hypertension. During this period, 346,686 (37.1 percent) cases of hypertension were reported. The chronic proteinuria group had the highest hypertension risk, followed by the proteinuria-developed, proteinuria-resolved, and proteinuria-free groups ($p<0.001$). Those who recovered from proteinuria had a lower risk of developing hypertension than those with chronic proteinuria (hazard ratio: 0.58; 95% CI: 0.53–0.63, $p<0.001$). See **Figure 2** and **Table 1**. Conclusion: Effective management of proteinuria may potentially decrease the risk of developing hypertension and thus future mortality.

2.2. Hypertension Classifications 2018 and 2024 Compared: Differences

Unlike the 2018 ESC/ESH hypertension guideline, which had different BP targets for treatment depending on age group, the 2024 ESC hypertension has a BP treatment target of <140/90 mmHg for all age groups with the proviso of BP treatment target of less than 130/80 mmHg if tolerated based on the ALARA principle (which is BP target As Low as Reasonably Achievable for all age groups. **Table 2** compares the 2018 ESC/ESH and 2024 ESC hypertension guidelines in detail.

Table 2. Comparisons of Hypertension Classifications Between 2018 & 2024		
Reference	**2018 ESC/ESH**	**2024 ESC**
Hypertension Definition	≥140/90mmHg	**≥140/90 mmHg**
Normal BP Ranges (mmHg)	Optimal <120/<80 Normal 120–129 / 80–84 High–Normal: 130–139 / 85–89	**Non-elevated BP: <120/70** **Elevated BP: 120-129 / 70–89**
Hypertensive BP Ranges (mmHg)	Hypertension Grade1: 140–159 / 90–99 Hypertension Grade2: 160–179 / 100–109 Hypertension Grade3: ≥180 / ≥110 Isolated systolic hypertension ≥140/<90	**Hypertension: ≥140/90**
BP Treatment Targets		**120–129 / 70–79 and if not possible or not tolerated** **As Low As Reasonably Achievable (ALARA) principle (Page 3,961, 2024 ESC Guidelines)**
18–64 years (mmHg)	<130/80	
65–79 years (mmHg)	<130/80	
>80 years (mmHg)	<130/80	
Pharmacotherapy	Initial therapy with beta-blockers reserved for specific conditions including ischaemic heart disease or heart failure	**Beta blockers included as first-line therapy for hypertension**
Source: Whelton PK, Carey RM. Manda G, et al. 2022. PMID: 35965201.[6] McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715[8]		

2.3. Hypertension Mechanisms and Hypertension Factors

Figure 3 reproduced from the 2024 ESC Figure 1 shows the current understanding of the hypertension mechanisms and factors. **Table 3** shows the effect of hypertension on organ damage in the eyes, brain, heart, large and medium arteries, kidneys, and microcirculation. Early and effective treatment of high blood pressure will hopefully attenuate such damage.

Figure 3. Hypertension Mechanisms and Factors

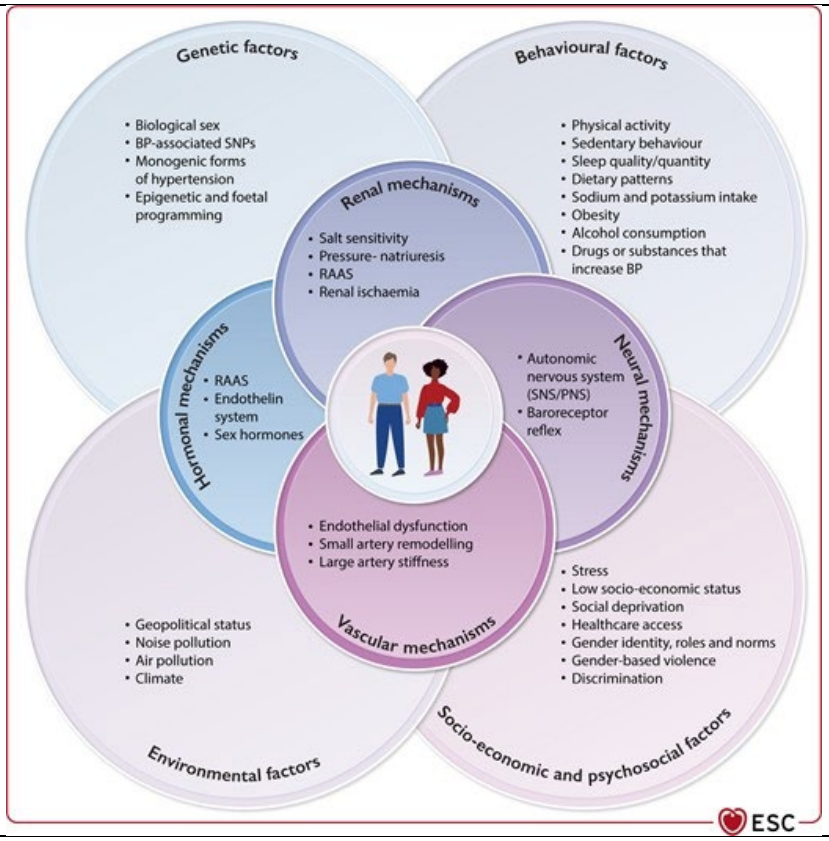
Hypertension mechanisms:

- ❖ Hormonal
- ❖ Renal
- ❖ Neural
- ❖ Vascular

Hypertension factors:

- ❖ Genetic factors
- ❖ Behavioural factors
- ❖ Socio-economic factors
- ❖ Environmental factors

2024 ESC Hypertension Guidelines



Source: Figure 1. McEvoy JW, McCarthy CP, Bruno BM et al. 2024 ESC. PMID: 39210715[8]

Table 3. 2024 ESC. Hypertension Mechanisms and Factors. Elevated BP, HT, and HMOD

No	Organ	Hypertension Mediated Organ Damage (HMOD)
1	Eye	Microvascular remodelling. Hypertensive retinopathy
2	Brain	White matter lesions, Silent microinfarcts, Microbleeds, Brain atrophy, Cognitive impairment, Vascular dementia, Ischaemic stroke, Cerebral haemorrhage
3	Heart	DM, LA and LV dilatation, AF, Obstructive and non-obstructive coronary artery disease, Myocardial infarction, Diastolic and/or systolic heart failure
4	Large & medium arteries	Atherosclerosis, Vascular calcification, Arterial stiffness
5	Kidney	Glomerular arteriolar hypertension, Glomerulosclarosis, Albuminuria/Proteinuria, Reduced GFR
6	Microcirculation	Endothelial dysfunction, Increased vasoreactivity, Vascular remodelling, Fibrosis and inflammation, Increased peripheral vascular resistance

Source: Figure 2. McEvoy JW, McCarthy CP, Bruno BM et al. 2024 ESC. PMID: 39210715[8]

3.2. Blood Pressure Measurement—Office, Home, and Ambulatory

Office blood pressure measurement needs to be checked against home blood pressure measurement or ambulatory blood pressure measurements. See details in **Tables 4–6**.

Table 4. Office blood pressure measurement	
1	Measure blood pressure after 5 minutes seated comfortably in a quiet environment
2	Use a validated device with an appropriate cuff size based on arm circumference
3	Place the BP cuff at the level of the heart with the patient's back and arm supported
4	Measure BP three times (1–2 min apart) and average the last 2 readings
5	Obtain further measurements if the readings differ by >10 mmHg
6	Measure BP in both arms at the first visit to detect between arm differences
7	Record heart rate and exclude arrhythmia by pulse palpation
Source: Figure 3. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715[8]	

Table 5. Home-Based Blood Pressure Measurement	
1	Measure blood pressure after 5 minutes of rest with arms and back supported
2	Use a validated BP device
3	Measure two readings on each occasion, 1–2 min apart
4	Obtain readings twice a day (morning and evenings) for at least 3 and usually 7 days
5	Measure BP in both arms at the first visit to detect between arm differences
6	Record and average all readings and present results to clinician Hypertension = average HPBM >135/85 mmHg
Source: Figure 4. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715[8]	

Table 6. Ambulatory Blood Pressure Measurement	
1	Use a validated BP device
2	Measure two readings on each occasion, 1–2 min apart
3	Obtain readings twice a day (morning and evenings) for at least 3 and usually 7 days
4	Measure BP in both arms at the first visit to detect between arm differences
Footnote: Hypertension: APBM ≥135/80 mmHg over 24 hours OR ≥135/85 mmHg for the daytime average OR ≥120/70 mmHg for the nighttime average	
Source: Figure 5. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715[8]	

Table 7 summarises the blood pressure readings for non-elevated blood pressure, elevated blood pressure, and hypertension for office BP, Home blood pressure measurement, and Ambulatory blood pressure measurements.

Table 7. Blood Pressure Classification 2024 ESC (Measurements in mmHg)

1	**Non-elevated blood pressure**	**Elevated blood pressure**	**Hypertension**
2	**Office BP** SBP<120 and DBP<70	**Office BP** SBP 120–139 or DBP 70–89	**Office BP** SBP≥140 and DBP≥90
3	**HBPM** SBP<120 and DBP<70	**HBPM** SBP 120–134 or DBP 70–84	**HBPM** SBP≥135 and DBP≥85
4	**ABPM** Daytime SBP<120 and Daytime DBP<70	**ABPM** Daytime SBP 120–134 or Daytime DBP 70–84	**ABPM** Daytime SBP≥135 or Daytime DBP≥85
5	Insufficient evidence confirming the efficacy and safety of BP pharmacological treatment	Risk-stratify to identify individuals with high cardiovascular risk for BP pharmacological treatment	Cardiovascular risk is sufficiently high to merit BP pharmacological treatment initiation
Footnote: The diagnosis of hypertension and elevated BP requires confirmation using out-of-office measurements (HBPM or ABPM) or at least one additional subsequent office measurement			
Source: Figure 6. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715[8]			

3.3. Risk Factors for Elevated BP Lowering

Table 8 shows the risk factors for elevated BP lowering to reduce adverse outcomes.

Table 8. Risk factors for elevated BP lowering to reduce adverse outcomes		
No	**Risk factor**	**Outcome being prevented**
1	Established clinical cardiovascular disease	Atherosclerotic cardiovascular disease Heart failure
2	Moderate or severe CKD	eGFR <60 mL/min/1.73m^2 OR Albuminuria >30 mg/g (≥3 mg/mmol)
3	Other forms of hypertension-mediated organ damage	Cardiac Vascular
4	Diabetes mellitus	Type 1 and type 2 diabetes mellitus
5	Familial hypercholesterolaemia	Probable or definite familial hypercholesterolemia
Source: Figure 7. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715.[8]		

3.4. Physical Activities and Lifestyle Changes That Can Reduce BP

Tables 9 and **10** show the physical activities and lifestyle changes that can reduce BP.

Table 9. Physical Activity and Lifestyle Changes to Reduce BP	
1	Aerobic exercise training of ≥150 min moderate intensity or 75 min vigorous intensity: brisk walking, jogging, cycling, swimming (Class I)

2	Increase daily physical activity (steps/day, take stairs, walk/cycle)
3	Avoid sedentary lifestyle
4	Isometric resistance training: Low-to-moderate-intensity (3 sets of 1–2 min contractions: hand-grip, plank, wall sit
5	Dynamic or isometric resistance training to complement aerobic exercise training 2–3 times/week (Class I)
6	Dynamic resistance exercise training: Large muscle groups, low-to-moderate-intensity (2–3 sets with 10–15 reps: squat, push-ups, sit-ups)
Source: Figure 16. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715.[8]	

Table 10. Physical Activity and Lifestyle to Reduce BP	
1	Increase potassium intake
2	Increase physical activity
3	Avoid sedentary lifestyle
4	Reduce salt (sodium chloride) intake
5	Reduce alcohol intake
6	No smoking
Source: Figure 17. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715.[8]	

3.5. Management of Hypertension in Frail Patients

Table 11 shows the management of BP in the nine categories of frail patients. The BP treatment targets are increasingly relaxed in frail patients as they enter into more frail categories and the number of hypertension medications is reduced.

Table 11. Management of BP in Frail Patients		
1	Very fit—People who are robust, active, energetic, and motivated. These people commonly exercise regularly. They are among the fittest for their age.	Follow BP-lowering treatment guidelines as per younger cohorts, ensuring treatment is tolerated.
2	Well—People who have no active disease symptoms but are less fit than Category 1. Often, they exercise or are very active occasionally, e.g., seasonally.	Evidence for benefits in reducing CVD events with more intensive treatment of BP.
3	Managing well—People whose medical problems are well controlled, but are not regularly active beyond routine walking.	Low-dose combination therapy to achieve BP control is reasonable.
4	Vulnerable—While not dependent on others for daily help, often symptoms limit activities. A common complaint is being slowed down, and/or being tired during the day.	ABPM if possible and regular review is important, particularly if change in frailty.
5	Mildly frail—These people often have more evident slowing, and	These people often have more evident slowing, and need help in high order

	need help in high order IADLs (finances, transportation, heavy housework, medications).	IADLs (finances, transportation, heavy homework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation, and housework.
6	Moderately frail—Patients need help with all outside activities and keeping house. Inside, they often have problems with stairs, need help with bathing, and may need cueing (prompting) and standing by with dressing.	Evidence for benefit in CV event reduction not strong (poorly represented in clinical trials).
7	Severely frail—Completely dependent for personal care, from whatever cause (physical or cognitive). They seem stable and not at high risk of dying (within 6 months).	Exercise caution and clinical judgement in intensifying BP-lowering treatment, employing a shared decision approach
8	Very severely frail—Completely dependent, approaching the end of life. Typically, they are unable to recover from even a minor illness.	Single drug therapy may be reasonable in this cohort when initiating or maintaining BP-lowering treatment.
9	Terminally ill—Approaching the end of life. This category applies to people with life expectancy <6 months, who are not otherwise evidently frail.	Monitor for symptomatic orthostatic hypotension (OH), asymptomatic OH with falls, and poor treatment tolerance. Clinical judgement and APBM/HPBM to guide deprescribing or prescribing.
Source: Figure 17. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715.[8]		

3.6. Managing resistant hypertension

The resistant hypertension management steps are shown in **Table 12**.

Table 12. Resistant Hypertension Management Steps	
1	Office BP ≥140/90 mmHg despite 3 or more BP-lowering medications at maximally tolerated doses, including a diuretic
2	Referral to hypertension centre should be considered (Class IIa). Exclude secondary and pseudo-resident hypertension; Treatment optimisation of BP-lowering medications, ideally 3-drug single pill combination (SPC)
3	3-drug SPC not effective. True treatment-resistant hypertension diagnosed
4	Spironolactone. If spironolactone is not tolerated, use eplerenone (Class IIa)
5	Beta-blocker (if not already recommended for a compelling indication) (Class IIa)
6	Intensification of pharmacotherapy (alpha blockers, centrally acting BP-lowering drugs, K sparing diuretics, others (Class IIa)
7	Renal denervation (Class IIa)
Source: Figure 10. McEvoy JW, McCarthy CP, Bruno BM, et al. 2024 ESC. PMID: 39210715[8]	

4. PROTEINURIA AND HYPERTENSION IN DIABETIC AND NON-DIABETIC PATIENTS

Chronic kidney disease (CKD) aetiology varies greatly between developed and developing countries. The meta-analysis by Hustrini NM et al[9] aims to identify the aetiology of advanced CKD in Southeast Asian nations.

Methods. A systematic search in four electronic-databases and complementary search on national kidney registries and repository libraries was conducted until 20 July 2023. The risk of bias was assessed using Newcastle-Ottawa Scale for observational studies and Version-2 of Cochrane for intervention studies. A random-effects model was used to estimate pooled prevalence. The protocol is registered in the International Prospective Register of Systematic Reviews PROSPERO; Registration ID:CRD42022300786.

Results. A meta-analysis of advanced chronic kidney disease in Southeast Asia published in 2024 (PMID-38587764) provided useful current information. The authors analysed 81 studies involving 32,834 subjects. Pooled prevalence of advanced CKD aetiologies in Southeast Asia showed the following results:

- Diabetic kidney disease 29.2% (95% CI 23.88–34.78)
- Glomerulonephritis 20.0% (95% CI 16.84–23.38)
- Hypertensive 16.8% (95% CI 14.05–19.70)
- Other 8.6% (95% CI 6.97–10.47)
- Unknown 7.5% (95% CI 4.32–11.50)

Table 13 provides the details of the participating countries in Southeast Asia.

Table 13. Aetiology of advanced chronic kidney disease in Southeast Asia: A meta-analysis—2024. PMID: 38587764
Hustrini et al analysed 81 studies involving 32,834 subjects. Nine of the 11 Southeast Asian countries participated: (Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam). Two did not participate (Lao People's Republic, Timor Leste). Pooled prevalence of advanced CKD aetiologies in Southeast Asia showed the following results: ❖ Diabetic kidney disease 29.2% (95% CI 23.88–34.78) ❖ Glomerulonephritis 20.0% (95% CI 16.84–23.38) ❖ Hypertensive 16.8% (95% CI 14.05–19.70) ❖ Other 8.6% (95% CI 6.97–10.47) ❖ Unknown 7.5% (95% CI 4.32–11.50)
Hustrini NM, Susalit E, Widjaja FF, et al. The Aetiology of Advanced Chronic Kidney Disease in Southeast Asia: A Meta-analysis. J Epidemiol Glob Health. 2024 Sep;14(3):740–764. PMID:38587764[9]

Discussion. The leading cause of advanced CKD in Southeast Asia is Diabetic kidney disease (DKD), with a substantial proportion of glomerulonephritis. An efficient screening programme targeting high-risk populations (diabetes mellitus and glomerulonephritis) is needed, with the aim of delaying CKD progression.

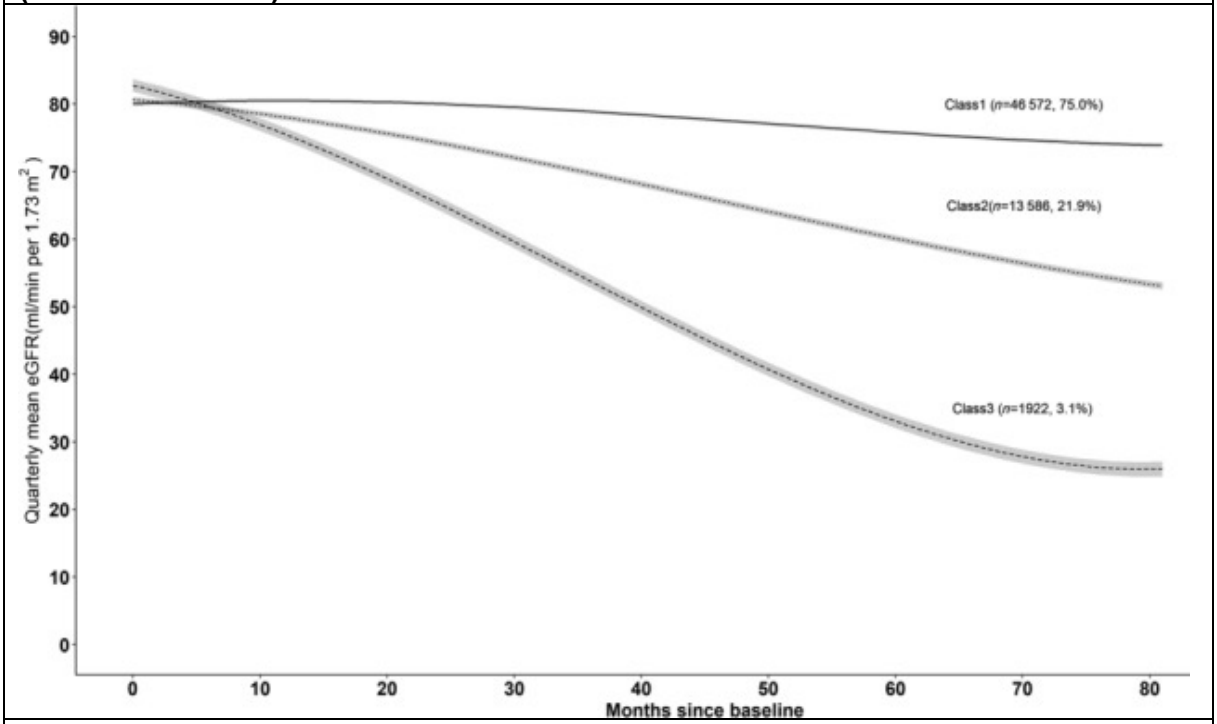
5. PROTEINURIA AND HYPERTENSION IN TYPE 2 DIABETIC PATIENTS IN SINGAPORE PATIENTS

The trajectory of estimated glomerular filtrate rate (eGFR), associated risk factors, and its relationship with end-stage kidney disease (ESKD) among a multiethnic patient population with type 2 diabetes in Singapore has been studied by Feng L et al[10] and published in 2024.

Methods: This study included 62,080 individuals with type 2 diabetes aged ≥18 years in a multi-institutional SingHealth Diabetes Registry between 2013 and 2019. eGFR trajectories were analysed using latent class linear mixed models. Factors associated with eGFR trajectories were evaluated using multinomial logistic regression. The association of eGFR trajectories with ESKD was assessed via competing risk models.

Results. Trajectory of kidney function, determined by eGFR, was nonlinear. The trajectory pattern was classified as stable initially then gradual decline (75 percent), progressive decline (21.9 percent), and rapid decline (3.1 percent). Younger age, female sex, Malay ethnicity, lower-income housing type, current smoking, higher glycated haemoglobin, lower low-density lipoprotein, higher triglyceride, uncontrolled blood pressure, albuminuria, cardiovascular disease, hypertension, and higher eGFR levels each were associated with progressive or rapid decline. Compared with the trajectory of stable initially then gradual eGFR decline, progressive decline increased the hazard of ESKD by 6.14-fold (95% confidence interval [CI]: 4.96–7.61)) and rapid decline by 82.55-fold (95% CI: 55.90-121.89). See **Figure 4**.

Figure 4. Kidney function trajectories, associated factors, and outcomes in multiethnic Asian patients with T2DM in SG (published in J Diabetes 2024 (PMID: 38169157)[10]



Younger age, female sex, Malay (vs Chinese) ethnicity, lower-cost housing type, current smoking, higher HbA1c, lower LDL-C, higher TG, higher albuminuria levels, uncontrolled BP, CVD, and hypertension were each associated with a progressive or rapid decline in kidney function

Discussion. Three nonlinear trajectory classes of kidney function were identified among multiethnic individuals with type 2 diabetes in Singapore. About one in four individuals had a progressive or rapid decline in eGFR. Results suggest that eGFR trajectories are correlated with multiple social and modifiable risk factors and inform the risk of ESKD.

CONCLUSION

The 2026 update on the topic of Proteinuria & Hypertension—With and Without Type 2 Diabetes Mellitus has added four new papers, one published in Feb 2026[1] on the benefits of SGLT2 inhibitors in glomerular diseases beyond glucose elimination in patients with diabetes, one published 2025[2] on avoiding the risk of rapid decline in eGFR by paying attention to controlling hypertension to near normal BP levels, and two papers on IgA nephropathy, both published in 2024.

This 2026 update also covered the following topics: Proteinuria without hypertension and proteinuria with hypertension; Differences in cutoffs in the hypertension classifications of 2018 and 2024; Hypertension mechanisms and factors; Aetiology of advanced CKD in Southeast Asia; and Kidney function outcomes in T2DM patients in Singapore circa 2024. Ten learning points were provided.

Learning Points

- SGLT2 inhibitors have additional benefits beyond glucose elimination in glomerular diseases.
- Controlling BP to high normal or elevated levels in patients receiving antihypertensive drugs reduced risk of rapid decline (defined as annual reduction >25%) in eGFR.
- The mainstay of therapy in IgA nephropathy is supportive, consisting of lifestyle modications, renin-angiotensin inhibition (if antihypertensive or proteinuric), SGLT2 inhibitors (if eGFR reduced or proteinuric), and endothelin-receptor antagonism (if proteinuric).
- The treatment of primary IgA nephropathy is likely to be effective with SGLT2 inhibitors, endothelin blockade, and complement inhibition.
- A nationwide population-based cohort study in South Korea demonstrated that proteinuria without hypertension needs to be treated to prevent persistent proteinuria and future mortality.
- Hypertension in older adults should be treated to prevent worse outcomes, but individualisation is important.
- The 2024 ESC retained the hypertension definition of ≥140/90 mmHg as defined by the 2018 ESC/ESH Additionally, 2024 ESC introduced two new BP reading cutoffs, namely, non-elevated BP of <120/70 mmHg and elevated BP 120–139 / 70–89 mmHg.
- In the 2024 ESC clinical practice guideline, the BP <140/90 mmHg, and less than 130/80 mmHg if tolerated, based on the ALARA (As Low as Reasonably Achieved) principle.
- A meta-analysis of advanced chronic kidney disease in Southeast Asia by Hustrini et al,[9] published in 2024 (PMID: 38587764), provided useful current information on advanced CKD aetiologies in Southeast Asia, namely: Diabetic kidney disease 29.2% (95% CI 23.88–34.78), Glomerulonephritis 20.0% (95% CI 16.84–23.38), Hypertensive 16.8% (95% CI 14.05–19.70), Other 8.6% (95% CI 6.97–10.47), and Unknown 7.5% (95% CI 4.32–11.50).

- Younger age, female sex, Malay (vs Chinese) ethnicity, lower cost housing type, current smoking, higher HbA1c, lower LDL-C, higher TG, higher albuminuria levels. Uncontrolled BP, CVD, and hypertension were associated with a progressive or rapid decline in kidney function.

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